

commercialize viable technology.¹⁰⁹ To the extent that the sale occurs only after a firm or project has failed, it is unlikely that payments for patents provide a significant added incentive to innovators beyond the incentive provided by the hope of a successful, patented product.¹¹⁰

In contrast to these uncertain benefits, the harms associated with PAE activity are the harms associated with all ex post patent assertions against manufacturers that have independently created or obtained the technology, as described in Section II.B. above. Such transactions can distort competition in technology markets, raise prices and decrease incentives to innovate. The extent of PAE activity in the IT sector amplifies the potential harm there.

VI. CONCLUSION

Attempts to address concerns about the detrimental effects of PAE activity on innovation and competition must be undertaken with sensitivity to the roles played by a patentee's ability to enforce and transfer its rights. The patentee's ability to allege patent infringement even against independent creators of the patented technology and enter ex post patent transactions is an important feature of the patent system's incentives to innovate.¹¹¹ Patent licensing, including ex post licensing, provides support to the business models based on technology transfer described in Chapter 1.¹¹² Other times, a patentee's most efficient way to monetize his patent is to sell it, making the right to transfer a patent an important component of its value and the patent system's incentives to innovate.¹¹³ Moreover, it is not clear how principles of patent law could be varied depending on the business model of the patent owner. It is difficult to distinguish patent

¹⁰⁹Kiani at 63-64 (3/18/09). Academic research has not yet resolved the extent to which the salvage value of patents provides ex ante incentives to invest in R&D. Ziedonis at 199 (5/4/09) (citing this as an unresolved research question while noting that "if these patents are basically sold in bankruptcy proceedings for fire-sale prices, then it's unclear to me how these markets for patents are actually stimulating the financing of these entrepreneurial firm activities").

¹¹⁰Merges at 240-41 (5/4/09).

¹¹¹See Cotropia & Lemley, *supra* note 19, at 1466 (reporting that the patent litigation system "gives patent owners control primarily over independent invention by third parties" and observing that this may "give inventors extra incentives or perhaps to create more certain rights that more easily can be licensed").

¹¹²Maghame at 169-70 (2/11/09) (explaining that "there isn't another choice other than to litigate" if an R&D firm "cannot negotiate licenses with people" who use its technology); Lord at 174-75 (2/11/09) (explaining that the ability to sue for patent damages was necessary to effectively negotiate technology transfer agreements to prevent copying).

¹¹³Ryan at 43 (4/17/09) (explaining that "small companies and individual inventors who had no way to monetize" sell their patents to PAEs).

transactions that harm innovation from those that promote it, and errors that undermine beneficial transactions can harm consumers.¹¹⁴

For these reasons, this report explores the conditions of patent law and policy that have created conditions where a patent market based on ex post transactions has flourished and addresses those conditions directly. Those conditions, discussed above, are those that lead to or create incentives for patentees to pursue ex post patent transactions rather than technology transfer: poor patent quality, problems of patent notice, and remedies that do not reflect the economic value of the patented technology. The remaining chapters of this report describe how to align these latter two areas of patent law with competition policy to increase innovation and enhance consumer welfare.

¹¹⁴C. J. Michel at 119 (12/5/08) (declaring that “the essential element of property is it is alienable” and asking “[w]hy should I be prohibited from buying patents if that’s what I want to do”).

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CHAPTER 3

PATENT NOTICE: A COMPETITION PERSPECTIVE

I. INTRODUCTION

Starting from an understanding that “[b]oth competition and patent policy can foster innovation, but each requires a proper balance with the other to do so,”¹ the FTC’s 2003 IP Report examined from a competition perspective the problems posed by questionable patents. It found that poor-quality patents were a significant competitive concern and a potential impediment to innovation, and it offered a number of recommendations for improvement. Although it examined a broad array of issues, its primary focus was on patent validity and overbreadth.²

The 2008/2009 hearings extended this foundation by examining an associated set of issues raised by the patent system’s notice function. Here the focus is on the extent to which patents and patent applications apprise the public – particularly third-party competitors and potential users of patented technology – concerning the metes and bounds of a patent’s right to exclude or the potential reach of claims that might emerge from an application. Under its strict liability regime, the patent system confers patent rights and assigns the burden of avoiding infringement to users; as a corollary, the system also needs to facilitate users’ ability to identify and understand the patent rights at hand. Otherwise, rivalry may be constrained, and innovation hindered, by misperceptions or uncertainty regarding infringement liability.

As highlighted by Chapters 1 and 2, notice plays a critical role in enabling patents to promote innovation. The technology transfers described in Chapter 1 are most effective when patents provide clear notice of their boundaries. This enables parties to contract efficiently, with confidence as to the technology rights that are conveyed, facilitating both collaboration among firms with complementary expertise and competition among inventions in technology markets. Conversely, the failure of notice in some sectors lies at the heart of problems from ex post patent assertion that may retard rather than promote innovation, as described in Chapter 2. Fundamentally, an effective notice system, in which prospective technology users can ascertain applicable patent rights at reasonable cost and with reasonable certainty, is essential for patents to operate as a property system.³

¹FED. TRADE COMM’N, TO PROMOTE INNOVATION: THE PROPER BALANCE OF COMPETITION AND PATENT LAW AND POLICY, Exec. Summ., at 1 (Oct. 2003) (“2003 FTC IP Report”), *available at* <http://ftc.gov/os/2003/10/innovationrpt.pdf>.

²*See id.*, Exec. Summ., at 5 (“A poor quality or questionable patent is one that is likely invalid or contains claims that are likely overly broad.”).

³*See* Bessen at 46-47 (3/19/09) (explaining that “[f]or a property system to function well, it has to have transparent public boundaries” that can be “predictably interpreted” as well as “clear rules for possession” and “low-cost clearance search”).

Yet, until recently,⁴ notice concerns have not necessarily been at the forefront of the patent community's attention. By and large, the patent system has focused on prosecuting applications for patent issuance and then litigating issues of validity and infringement. Courts have formulated patent doctrines with these core needs in mind. Notice considerations – largely distinct from these primary objectives – have tended to take a back seat. Sometimes the substantive inquiry has been framed in terms that serve notice objectives as well, such as when the written description in an application is analyzed in terms of what a hypothetical person having ordinary skill in the art would understand. But notice concerns implicate, and become intertwined with the objectives of, multiple other patent law doctrines and procedures, including claim construction, written description, and enablement.

This chapter seeks to highlight public notice as an objective in its own right, one worthy of heightened attention in view of its implications for competition and innovation. It first examines the competitive significance of the notice function in greater detail. Next it reviews the hearing evidence to identify specific notice problems that have emerged. A final section then proposes steps that might significantly enhance public notice, bringing the patent system and competition into better alignment.

II. PATENT NOTICE AS AN AID TO COMPETITION AND INNOVATION

Patent law requires the patentee to distinctly claim his or her invention,⁵ thereby “giv[ing] public notice of the subject matter that is protected”⁶ and “appris[ing] the public of what is still open to them.”⁷ Notice promotes the invention, development, and commercialization of innovative products, one of the most important forms of competition,⁸ by helping third parties and patentees avoid “uncertainty as to their rights.”⁹

⁴Shortly before issuance of this report the Patent and Trademark Office issued examination guidelines that give considerable emphasis to notice concerns. See USPTO, *Supplementary Examination Guidelines for Determining Compliance with 35 U.S.C. 112*, 76 Fed. Reg. 7,162 (Feb. 9, 2011) (“Supplementary Examination Guidelines”). For discussion of other promising recent signs of increased recognition of notice concerns, see *infra* section IV.A.

⁵35 U.S.C. § 112.

⁶*Univ. of Rochester v. G.D. Searle & Co.*, 358 F.3d 916, 922 n.5 (Fed. Cir. 2004).

⁷*McClain v. Ortmayer*, 141 U.S. 419, 424 (1891).

⁸Indeed, innovative products may “create competition” that transforms a market, challenges entrenched market power, and gives rise to a new industry. JOSEPH A. SCHUMPETER, *CAPITALISM, SOCIALISM, AND DEMOCRACY*, ch. 7 (1976).

⁹*Gen. Elec. Co. v. Wabash Appliance Corp.*, 304 U.S. 364, 369 (1938).

Such uncertainty can greatly inhibit innovation and competition.¹⁰ “[P]atent infringement is a strict liability offense.”¹¹ Infringers are subject to injunctive relief and, with some limitations, damages,¹² regardless of whether they were aware of the existence of the patent or that it covered their activity.¹³ As a result, a firm commercializing a new product and seeking to avoid later infringement allegations is responsible for identifying and licensing patents that read on the product. Inability to effectively “clear” patents can result in burdensome litigation and expensive remedies, even for unintended infringement. Poor patent notice undermines innovation and competition by raising the risk of such infringement and imposing “a very high overhead” on innovation.¹⁴

Notice and efficient investment in innovation. As the Supreme Court has explained, “[C]larity [regarding patent rights] is essential to promote progress, because it enables efficient

¹⁰See Ted M. Sichelman, *Commercializing Patents*, 62 STAN L. REV. 341, 361 (2010).

¹¹*In re Seagate Techs., LLC*, 497 F.3d 1360, 1368 (Fed. Cir. 2007); see also David J. Kappos, *Building Bridges and Making Connections Across the IP System*, 20 FED. CIRCUIT B.J. 273, 275 (2010) (“patent infringement is, by definition, a strict liability tort”).

¹²The patent marking requirement, 35 U.S.C. § 287(a), provides that patentees that make, use, sell, or offer to sell a patented article must either mark the article or packaging with the patent number, or be entitled to damages only for infringement that occurs after they provide actual notice to the infringer. See Roger D. Blair & Thomas F. Cotter, *Strict Liability and its Alternatives in Patent Law*, 17 BERKELEY TECH. L. J. 799, 800, 801 (2002) (suggesting that the patent system does not impose strict liability “in the purest sense” because, due to the marking requirement, an infringer “is often not liable for damages until the plaintiff puts her on notice”). However, the marking requirement is sharply circumscribed – it does not affect liability for infringement of method or process patents or of idle patents (which do not give rise to products), and it does not place any limits on injunctive relief. See *id.* at 804-07 (also noting that there is no requirement that marking provide actual notice to the defendant); see generally JOHN M. SKENYON, CHRISTOPHER S. MARCHESE & JOHN LAND, *PATENT DAMAGES LAW AND PRACTICE* § 1:24 (2008) (describing § 287(a) and its limitations).

¹³Blair & Cotter, *supra* note 12, at 800-01 (“a defendant may be liable without having had any notice, prior to the filing of an infringement action, that her conduct was infringing”); Mark A. Lemley, *Should Patent Infringement Require Proof of Copying?*, 105 MICH. L. REV. 1525, 1525 (2007) (“those who independently develop a technology with no knowledge of the patent or the patentee” may be held liable for infringement).

¹⁴Menell at 29 (5/5/09); see also John H. Johnson, Gregory K. Leonard, Christine Meyer & Ken Serwin, *Please Don't Feed the Trolls?*, 42 LES NOUVELLES 487, 489 (Sept. 2007) (the risk of unforeseen patent claims “adds significant cost to the product development project”); Graham at 142-43 (4/17/09) (“uncertainty . . . over the final boundaries . . . or over the validity of the property right” may “add transaction costs to commercialization, technology transfer and developing markets for intellectual property”); IBM Comment at 2 (2/12/09) (“If the boundary created by the patent claims is ambiguous, the public has inadequate notice of the invention and it is more likely that people will inadvertently infringe.”); Am. Intell. Property Law Ass’n Comment at 7 (May 15, 2009).

investment in innovation.”¹⁵ If firms can identify and assess the scope of relevant patents in advance of launching a product, they can select technologies based on a knowledge of the applicable patent rights. Conversely, when the notice function fails, firms must make key competitive decisions on product design and R&D directions in the face of uncertainty as to potential patent liability, inhibiting their efforts to innovate and compete.¹⁶

Poor patent notice may cause firms to cut back on procompetitive innovation, reducing competitive vigor and depriving consumers of new technologies. Firms reduce their R&D expenditures in the face of increased uncertainty.¹⁷ In addition, when there is a “lack of clarity around patent rights,” firms “routinely . . . move away from technology areas, move into different technology areas, steer clear of innovations that [they would] otherwise want to invest in.”¹⁸ Finally, when firms are unable to identify and assess patent risks before selecting inputs for new products, services, or features, poor patent notice may force them to “choose between the risk of being sued for infringement after they sink costs into invention or production, or dropping innovative or productive efforts altogether.”¹⁹

Coping with poor patent notice. Firms can reduce uncertainty regarding infringement liability by investing time and resources to identify and review patents that might cover a technology used in their new product. Such patent clearance efforts are generally effective in certain industries, such as chemicals, pharmaceuticals, and biotechnology,²⁰ even if some uncertainty remains.²¹ However, when the notice function is poorly served, the costs of identifying and analyzing relevant patents can be onerous.²² Moreover, in some fields such as IT

¹⁵Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co., 535 U.S. 722, 730-31 (2002).

¹⁶See generally JAMES BESSEN & MICHAEL J. MEURER, PATENT FAILURE 9 (2008) (“Poor notice causes harm because it subjects technology investors to an unavoidable risk of disputes and litigation. The expected cost of inadvertent infringement imposes a *disincentive* on technology investors.”).

¹⁷Phillips at 202 (3/18/09) (“To the extent that there’s uncertainty, unpredictability, risk[, firms are] going to spend less money on R&D.”); Menell at 127-28 (5/5/09) (the inability to know the potential damages that might result from projects under development “just chills . . . innovation unnecessarily”).

¹⁸Kappos at 132 (3/19/09).

¹⁹2003 FTC IP Report, ch.2, at 28.

²⁰See *infra* Section III.C.; see also Shafmaster at 216 (3/18/09) (Genzyme “make[s] sure before embarking on development pathways that we will have all the rights we need”).

²¹See, e.g., Shafmaster at 238 (3/18/09) (“[t]here’s always some uncertainty” in assessing a patent); Myers at 238 (3/18/09) (“it’s never a matter of having zero risk”).

²²See, e.g., Bright at 38 (5/4/09) (firms “spend a tremendous amount of time studying the specifications, applying the law ourselves”); BESSEN & MEURER, *supra* note 16, at 55 (noting the \$20,000 to \$100,000 cost of legal opinion letters) and 70 (observing that the cost of clearance “ratchets up” when patents have

and telecommunications, patent notice functions so poorly that even massive efforts might not reliably clear all relevant patents,²³ although businesses frequently choose to go forward despite this uncertainty.²⁴

When risks of patent liability are identified, firms may be able to design around patented technology²⁵ or to license potentially applicable patents.²⁶ However, in doing so they incur costs – developing and implementing an alternative (and perhaps inferior) technology or paying royalties. When patents provide poor notice of their scope, the resulting uncertainty may force a firm to incur these costs unnecessarily for patents that would not be held to cover their product, burdening innovative activities and raising prices.²⁷ Similarly, poor notice regarding patent scope can lead patent pools to include patents that are not really essential to implementing a standard.²⁸

When poor patent notice leads innovative firms to launch products despite uncertainty regarding potential infringement, they risk facing patent assertions post launch. Resolving these claims often involves expensive and disruptive litigation, including disputes over the scope of

“fuzzy boundaries”).

²³See *infra* Section III.C.

²⁴See, e.g., Harris at 124 (3/18/09) (reporting that AOL goes forward if it is a good business decision to get in the market, despite uncertainty); Rogers at 125 (3/18/09) (explaining that Qualcomm comes to “the best understanding that we can and we make decisions based on it”); Slifer at 125 (3/18/09) (explaining that Micron invests based on “competition and consumers” without expending “much time” on “futile” efforts to achieve certainty).

²⁵See Simon at 202-03 (2/11/09) (explaining that Intel “almost invariably ha[s] another option” that it would take if its patent exposure were known at the time of the design decision); Horton at 191 (3/18/09) (designing around is “[t]he best avenue” and “almost always the cheapest”).

²⁶Horton at 173 (3/18/09) (“the most cost efficient way to deal with other[s’] patents is up-front, identify them early, license them in where you can’t design around them”); Bellon at 229-30 (3/18/09); Phillips at 202 (3/18/09) (Exxon/Mobil sometimes licenses pending patents to address the risk they pose).

²⁷See, e.g., Sprigman at 77 (2/12/09) (indicating that parties enter into licenses based on “interpretations of the claim terms that probably wouldn’t have passed muster before the PTO and may not pass muster before a court, but because they are problematic”); Software & Information Industry Association Comment at 5-6 (2/5/09) (describing the pressures on firms to take licenses even when arguments regarding infringement are weak); *but cf.* Horton at 192 (3/18/09) (suggesting that licenses can partly address this problem by making the amount of payments contingent on subsequent determinations of the patent’s scope).

²⁸See *Princo Corp. v. Int’l Trade Comm’n*, 563 F.3d 1301, 1309-12 (Fed. Cir.) (avoiding resolution of a claim construction dispute by holding that a patent was properly included in a pool as “essential” when it “reasonably might be necessary” to manufacture the relevant standardized products), *vacated for en banc review*, 583 F.3d 1380 (Fed. Cir. 2009), *reinstated in relevant part*, 616 F.3d 1318, 1326 n.1 (Fed. Cir. 2010) (*en banc*).

unclear patent claims that increase these costs.²⁹ Furthermore, if the alleged infringer would face large switching costs due to sunk investments based on the patented technology, it may be forced to pay higher royalties than it would have negotiated prior to launch.³⁰ These risks increase expected costs, reducing firms' incentives to pursue innovative projects,³¹ while the associated expenses cause firms to reduce spending on R&D.³²

Notice and efficient development of patented technology. Poor notice as to a patent's scope undermines the patentee's ability to exploit the patented technology, either by practicing it or transferring it to another firm for commercial development. When the scope of the patent is unclear, a patentee's financial backers ultimately may conclude that the patent does not provide sufficient protection from imitation to justify investing in commercialization.³³ Similarly, uncertainty regarding patent scope may lead potential licensees to misvalue a patent³⁴ or to decide

²⁹See Durie at 71 (5/5/09) (patents that are "imprecise" or "susceptible to many different interpretations" are more difficult to litigate against); Kappos at 122 (3/19/09) ("unclear" or "ambiguous" claims "force[] all participants, at least in the information technology industry, to spend undue amounts of effort on dealing with conflict"); IBM Comment at 2 (2/12/09) (When patents "lack [] clear boundaries . . . [t]he result is often expensive lawsuits to determine the meaning of the claims, and a costly judgment if those parties are ultimately found to have interpreted the claims, in good faith, incorrectly – or costly settlement in advance of litigation").

³⁰See *supra* Chapter 2, Section II; Verizon Comment at 3 (3/20/09) ("[H]igh switching costs can drive high royalty demands, well in excess of the economic value of the patent."); Software & Information Industry Association Comment at 5-6 (2/5/09) (similar); Mark A. Lemley & Carl Shapiro, *Patent Holdup and Royalty Stacking*, 85 TEX. L. REV. 1991 (2007).

³¹See, e.g., BESSEN & MEURER, *supra* note 16, at 131 ("an innovator will look at this risk [that patent litigation may arise] as a cost to weigh against the expected profits from the new technology"); Carl Shapiro, *Navigating the Patent Thicket: Cross Licenses, Patent Pools, and Standard-Setting*, in 1 INNOVATION POLICY AND THE ECONOMY 119, 126 (2001) (indicating that some companies will "refrain from introducing certain products for fear of holdup").

³²See Yen at 89 (12/5/08) (patent litigation "takes money away from innovation and . . . being able to hire the engineers and have the resources to develop product"); Kappos at 122 (3/19/09).

³³See DeVore at 31 (5/4/09); Shema at 32 (5/4/09); BESSEN & MEURER, *supra* note 16, at 130. The significance of this concern may vary by industry. See Lemley at 194 (4/17/09) (observing that while "pharmaceutical companies will not enter into new drug investigations unless they're confident up-front that they have a patent portfolio that will cover those drugs," software industry venture capitalists "don't care . . . what the claim construction is going to end up being").

³⁴See Kappos at 131 (3/19/09) (explaining that when notice is inadequate "we're either getting or paying the wrong amount for these things because they can't be valued accurately"); Lemley at 147-48 (4/17/09) (identifying poor notice as contributing to markets that "don't drive you to the right price").

not to acquire and commercialize a technology.³⁵ “if you don’t have IP rights that are understood by the purveyor of them and the receiver of them, you don’t have the necessary scaffolding to build a good . . . bridge there between the two sides.”³⁶ Purchasers may undervalue good patents due to the difficulty of “tell[ing] the difference between the good stuff and the bad stuff”³⁷ and may discount the value of patents whose scope is unclear.³⁸ An inability to accurately price patented technologies thus disrupts the efficient functioning of technology markets and may result in reduced technology transfer and less innovation.

III. THE NATURE AND SOURCES OF NOTICE PROBLEMS

While panelists at the hearings generally agreed that notice is an issue of broad importance to the patent system, participants from different industries reported varying degrees of difficulty in securing adequate notice and split in their overall conclusions regarding the manageability of current problems.

By far the most serious concerns were identified in the IT sector, where some panelists asserted that the notice function “is not well served at all”³⁹ or declared that “it is virtually impossible to conduct a meaningful patent clearance.”⁴⁰ As a result, others noted, IT firms frequently do not perform clearance searches when introducing products, instead essentially “ignor[ing] patents.”⁴¹ In contrast, panelists who addressed other industries, most notably the pharmaceutical and biotech sectors, indicated that the notice function “by and large” is “very well

³⁵See Lemley at 147-48 (4/17/09) (observing that notice problems contribute to “leav[ing] a lot of transactional money on the table in the sense that transactions that should have occurred, that would benefit both the buyer and seller, don’t occur”); Bessen at 50 (3/19/09) (“deals don’t happen that could happen”); Wagner at 192 (4/17/09) (“every bit of uncertainty . . . undermines” the ability to engage in technology transfer). See *supra* Chapter 1.

³⁶Phelps at 250 (5/4/09).

³⁷Kappos at 131 (3/19/09); see also Lemley at 148 (4/17/09) (describing the patent market as a “market for lemons” in which patents are undervalued because “people are afraid of being taken”).

³⁸See Bessen at 49 (3/19/09) (explaining that in the presence of notice problems, buyers must account for dispute risk).

³⁹Lee at 7 (5/5/09).

⁴⁰Durie at 18 (5/5/09).

⁴¹Kahin at 61 (12/5/08); see also Mark A. Lemley, *Ignoring Patents*, 2008 MICH. ST. L. REV. 19, 21 (2008) (“[B]oth researchers and companies in component industries simply ignore patents. Virtually everyone does it.”).

met.”⁴² Indeed, panelists viewed patent clearance as “mandatory” in those sectors, explaining that firms “very carefully [review] the patent landscape” when launching a product to ensure that their ability to commercialize the invention will not be compromised by other parties’ patent rights.⁴³ While they indicated that clearance tasks were sometimes difficult and resource-intensive, they found them manageable.

To explore these issues more deeply, this section examines three challenges confronted by firms seeking to clear patents that might read on their planned activities. The first is interpreting claims in issued patents to obtain a clear understanding of their scope and whether they cover the firm’s product or process. Perfection here is likely and practicably unobtainable; some ambiguity may remain despite best efforts to encapsulate an invention in words.⁴⁴ The second challenge is predicting what claims might emerge from pending patent applications. The third is finding mechanisms for identifying potentially relevant patents or applications that must be carefully reviewed for clearance purposes. We examine the hearing record for each topic in turn.

A. Difficulties in Interpreting the Boundaries of Issued Claims

To fulfill their notice function, patent claims must delineate the scope of patent rights with sufficient clarity that a person skilled in the relevant art can reliably determine whether planned activities would infringe. Many panelists declared that patents often provide little guidance as to their coverage because they lack “clarity,” i.e., they are “vague,” “ambiguous,” or otherwise difficult to interpret.⁴⁵ Some of this testimony addressed patents across the board.⁴⁶

⁴²Armitage at 120 (3/19/09) (arguing that this holds once claims that would be held invalid are set aside); *see also* Meurer at 210-11 (12/5/08).

⁴³Singer at 244 (3/18/09); *see also* Jensen at 244 (3/18/09) (noting that venture capitalists require such searches for funding).

⁴⁴*See* BESSEN & MEURER, *supra* note 16, at 10 (“While surveyors can plainly map the words in a deed to a physical boundary, it is much harder to map the words in a patent to technologies . . .”).

⁴⁵*See e.g.*, Kappos at 122-23 (3/19/09) (expressing concern about issued claims “that are unclear, that are ambiguous”); Luftman at 220-21 (2/12/09) (expressing concern about patents that are “vague enough” that Palm is “sucked into” an infringement lawsuit).

⁴⁶*See, e.g.*, Lemley at 148 (4/17/09) (“It is virtually impossible for anybody to know in most industries most of the time whether a patent that they’re looking at is valid or invalid, what that patent covers and therefore whether or not it’s likely to be infringed”); Wagner at 184 (4/17/09) (terming the “fact that we cannot figure out claim construction . . . deeply harmful to the patent system”); Sprigman at 34 (2/12/09) (“the boundaries of patent[s] are very indistinct . . . [and] require interpretation, interpretation that is costly and subject often to error”); Menell at 32 (5/5/09) (claim construction is “highly indeterminate – it’s really risk management”); Meurer at 211 (12/5/09) (“fuzzy boundaries” are a problem); *see also* BESSEN & MEURER, *supra* note 16, at 54-62.

Most of it, however, addressed the specific context of IT and telecommunications industries.⁴⁷ One IT panelist explained that the “lack of clarity around patent rights” adversely affects R&D investment in that sector.⁴⁸ Others described how claims asserted in litigation are “stretch[ed]”⁴⁹ or “re-crafted”⁵⁰ in ways that could never have been anticipated.

Testimony revealed substantially less concern in chemical, pharmaceutical and biotech contexts. One panelist, in discussing chemical compounds and biotech products, asserted that with a “modest amount of effort and cost, you can look at a patent and know where you stand.”⁵¹ According to another, “[U]ncertainty around the scope of issued patent claims . . . [is] probably overblown” in biotech, because “there’s enough case law out there to give us sufficient guidance.”⁵² Even so, a third panelist reported that interpreting biotech patent claims can be a “struggle,” adding that at times “I can’t even tell from the specification what they mean.”⁵³ And a fourth acknowledged that even in biotech, “There’s always some uncertainty that the court might not come to the same interpretation that you’ve come to, and that plays into risk . . . and how much am I willing to invest given this level of risk.”⁵⁴

Those who found claim construction manageable emphasized the importance of looking beyond the claims themselves and relying heavily on review of the patent’s description of the invention to sort out claim meaning. “[E]ssentially you go back to the specification,” one

⁴⁷See, e.g., Crean at 97 (5/4/09) (“vague and amorphous patent claim and claim boundaries”); Gutierrez at 143 (5/4/09) (“lack of specificity”); Lee at 9 (5/5/09) (“lack of clarity and boundaries in software patents”); Verizon Communications Inc. Comment at 6 (3/20/09) (“the boundaries of patents are sometimes fuzzy”).

⁴⁸Kappos at 132 (3/19/09).

⁴⁹Harris at 123 (3/18/09); *see also* Yen at 54 (12/5/08) (alleged infringers “would often never recognize most of the patents that ultimately are asserted”).

⁵⁰Luftman at 220-21 (2/12/09).

⁵¹Kushan at 248-50 (12/5/08).

⁵²Myers at 237-38 (3/18/09).

⁵³Shema at 71 (5/4/09). Similarly, a panelist from the oil and petrochemical industries noted that while “patents that cover a pure chemical are relatively easy to analyze,” challenges arise with products composed of “many, many, many dozens of molecules.” Phillips at 176 (3/18/09).

⁵⁴Shafmaster at 238 (3/18/09).

panelist explained, continuing, “[I]n terms of notice . . . we look through the claims and we see what is actually supported by the specification.”⁵⁵ Others testified similarly.⁵⁶

For contexts where problems did emerge, panelists suggested several sources of ambiguity. These include the inherent imprecision of language, varying nomenclature, functional claiming, and faulty incentives. They also emphasized various institutional issues that may delay resolution of ambiguity.

Inherent imprecision of language. A central obstacle to clear patent claims identified by panelists is the “imprecision” inherent in using the English language to describe an invention, i.e., the “fundamentally poor fit between language . . . and what it is that we’re trying to describe.”⁵⁷ Sometimes the problem may be industry-specific. For example, software patents often cover “very abstract conceptual innovations” that can’t be simply described given our current understanding of the area,⁵⁸ and can be claimed in “unique ways.”⁵⁹ Moreover, the hearing record indicated, the convention of writing “one-sentence English-language claims” may fit poorly with “the symbolic rules and procedures adopted by the field of software engineers.”⁶⁰ Although some panelists suggested that these clarity problems will improve as the software industry’s experience with patents increases,⁶¹ others noted that there had been little improvement over several decades of software patenting.⁶²

Other language problems are general in nature. Thus, one panelist pointed out that “indeterminacy” resulting in litigation often arises even from “very common terms,” such a

⁵⁵Kushan at 249 (12/5/08).

⁵⁶See, e.g., Shema at 60 (5/4/09) (“[T]he [Section]112 [disclosure] standards that have developed in our industry help us to analyze our competitor’s patents.”).

⁵⁷Duric at 45-46 (5/5/09); see also Messinger at 184-85 (3/19/09).

⁵⁸Menell at 29 (5/5/09); see also BESSEN & MEURER, *supra* note 16, at 200 (describing how software patents can “map onto an uncertain set of technologies” when not limited to distinct embodiments, and “might be particularly prone to strategic use of vague language.” But cf. Wagner at 221-22 (4/17/09) (resisting excessive pessimism regarding software claiming and arguing that software can be discussed “in a very structured format”).

⁵⁹Sarboraria at 120 (3/18/09) (observing that “it is often unclear whether a given claim reads on software at all”).

⁶⁰Michael F. Martin Comment at 13 (5/15/09).

⁶¹Wagner at 222 (4/17/09); Valz at 239 (12/5/08).

⁶²Kappos at 150 (3/19/09).

“‘through,’ . . . ‘to’, [or] ‘beside.’”⁶³ Another panelist stressed the importance of the doctrine of equivalents – which may extend a claim’s coverage beyond its literal terms – for “those relatively rare situations” where “there just wasn’t plain a word or collection of words that was going to work” and denying infringement would be “manifestly unfair.”⁶⁴

Varying nomenclature. A major contributor to clarity is the existence of “a good, solid, consistent lexicon” for claiming in a technology area.⁶⁵ Thus, in biotech and chemistry there is a “relatively predictable set of terminology” or nomenclature for describing inventions⁶⁶ – most prominently chemistry’s use of the periodic table and molecular structures.⁶⁷ Beyond this, the biotech community has invested considerable effort in developing a common nomenclature.⁶⁸ In contrast, panelists described how the IT industries, especially software, lack “clear”⁶⁹ and “uniform”⁷⁰ nomenclatures and “common vocabular[ies].”⁷¹

Functional claiming. Reliance on functional language (explaining “what the invention does”) rather than structural language (explaining “what the invention is”) was another source of vagueness identified by panelists.⁷² Functional claims can be “abstract [or] conceptual,”⁷³

⁶³Burk at 10 (5/5/09).

⁶⁴Clarke at 203 (3/19/09) (suggesting that such limited use of the doctrine of equivalents appropriately accommodates notice goals but that more expansive and frequent use would pose problems). *But see* Petherbridge at 43 (5/5/09) (suggesting eliminating the doctrine of equivalents).

⁶⁵Kappos at 149 (3/19/09) (i.e., “where there is a dictionary of some form”); *see also* Wagner at 198 (4/17/09) (claim construction works “where we have a fairly well understood set of nomenclature”).

⁶⁶Durie at 18 (5/5/09); *see also* Lemley at 195 (4/17/09) (describing the boundaries of the patent “doesn’t work outside of a few industries like pharmaceuticals and DNA where we have a clear nomenclature that everybody understands”).

⁶⁷Menell at 29 (5/5/09); *see also* Horton at 174 (3/18/09); Hall at 264 (5/4/09); Vermont at 221 (4/17/09).

⁶⁸Shema at 70-71 (5/4/09) (also noting the PTO’s publication of Sequence Listing Rules to govern structural aspects of DNA inventions).

⁶⁹Lemley at 195 (4/17/09).

⁷⁰Kushan at 269 (5/5/09). Similarly, one panelist observed that IT terminology frequently uses words that are generic, such as “processing” or “storing,” that can be construed broadly even if the context suggests a narrow meaning. Lutton at 162-63 (5/4/09).

⁷¹Lee at 7 (5/5/09).

⁷²Kunin at 114 (3/19/09) (stating that when claims are “written in fairly abstract form, both as to pure functionality and . . . from the standpoint of what the invention does as opposed to what the invention is,” it is “very difficult to know what the claims cover and what you may have to do to avoid infringement”); *see also* Kappos at 174 (3/19/09) (discussing claims that cover “the effect of what was done rather than

making it difficult to predict the various ways in which the claim might be construed.⁷⁴ Panelists found “results-based claiming” a “big problem in the IT arts,” particularly software.⁷⁵ Some panelists warned that functional claiming also impacts biotech patenting,⁷⁶ but others explained that it raises fewer concerns in that industry because patentees in biotech must provide considerable information regarding the invention’s structure in the specification or the claim.⁷⁷

Faulty incentives. Some panelists argued that the system generally creates “an incentive to be as vague and ambiguous as you can with your claims”⁷⁸ and to “defer clarity at all costs.”⁷⁹ According to one panelist, applicants try to be “as vague as possible, avoid any expression of meaning with the hope that when they get to litigation, they can broaden the meaning beyond what the Patent Office assumed it was.”⁸⁰ The view was not unanimous, however, and other panelists asserted reasons why patentees would want their patents to be clear.⁸¹ Indeed, one panelist explicitly acknowledged that incentives are in “tension.”⁸²

what was actually created”).

⁷³Menell at 29 (5/5/09).

⁷⁴See Meurer at 210 (12/5/08) (“The more functional the claiming is, the harder it is for anyone to understand what the property rights are.”). *But cf.* Duffy at 263-64 (12/5/08) (suggesting that the true source of construction problems may be “excessive literalism,” including failure to adequately draw upon the specification, rather than functional language in itself).

⁷⁵Kappos at 174 (3/19/09); *see also* Lee at 8-9 (5/5/09) (functional claiming is leading to “a failure of notice” regarding the boundaries of software patents).

⁷⁶Meurer at 209 (12/5/08).

⁷⁷See, e.g., Shema at 59-60 (5/4/09) (citing a need to “claim things structurally” and reference “representative samples”); Kushan at 249 (12/5/08) (“I don’t think there’s any major impediment about translating and interpreting functional language” in biotech “because essentially you go back to the specification.”).

⁷⁸Kappos at 123 (3/19/09); *see also* Petherbridge at 15 (5/5/09).

⁷⁹Wagner at 181 (4/17/09).

⁸⁰Wagner at 200-201 (4/17/09).

⁸¹See Messinger at 117 (3/19/09) (observing that clarity enables the patentee to rely on the resulting patent); Menell at 53 (5/5/09) (arguing that in biomedical fields applicants want a “strong[] claim . . . so that they can justify all of the clinical testing” and other expense).

⁸²McNelis at 86 (5/5/09) (noting the “natural tension as a patent practitioner of trying to have a clear, concise patent, but also trying to have the broadest scope”).

Institutional concerns/deferred resolution. Panelists further described how the patent system generally defers resolution of ambiguities. One noted that examination at the PTO typically focuses on issues of novelty and nonobviousness rather than clarity.⁸³ Moreover, as another panelist argued, there is “no good mechanism short of litigation, the courthouse door, for testing just what a patent really covers”;⁸⁴ the PTO reexamination system is confined to questions of novelty and nonobviousness, and cannot be used directly for testing the scope of a claim.⁸⁵

Finally, panelists pointed to the delay, expense, and uncertainty imposed by litigation over claim scope.⁸⁶ District court judges, they note, often hold claim-construction hearings after much litigation expense has been incurred.⁸⁷ Moreover, district court claim constructions are overturned by the Federal Circuit in approximately one-third of appeals,⁸⁸ leading panelists and commentators to argue that claim meaning is not known until the Federal Circuit has ruled.⁸⁹

⁸³Messinger at 170 (3/19/09).

⁸⁴Phillips at 177 (3/18/09) (describing this as “a fundamental failing . . . of the U.S. patent system”); *see also* Verizon Communications, Inc. Comment at 6 (3/20/09) (“Counsel’s opinion as to the boundaries of the patent is both expensive and often unavoidably ‘unreliable,’ leaving commercializers with ‘no reliable way of determining patent boundaries short of litigation.’”) (*quoting* BESSEN & MEURER, *supra* note 16, at 10).

⁸⁵*See* 35 U.S.C. § 303 (providing for reexamination “upon a finding that prior art cited under 35 U.S.C. § 302 presents “a substantial new question of patentability”); Van Pelt at 155 (5/4/09); *see also* IBM Comment at 8 (2/12/09) (arguing that permitting challengers to raise indefiniteness in any post-grant procedures would permit “timely clarification or invalidation of claims as necessary”).

⁸⁶*See, e.g.,* Durie at 69 (5/5/09) (“the cost of litigation is simply prohibitive” for “relatively small start-up companies”); IBM Comment at 2 (2/12/2009).

⁸⁷Harris at 121 (3/18/09) (“the *Markman* [claim-construction] or any other dispositive motions are heard right before trial”).

⁸⁸Meurer at 211 (12/5/08) (citing work by Judge Kimberly Moore); *see* Kimberly A. Moore, *Markman Eight Years Later: Is Claim Construction More Predictable?*, 9 LEWIS & CLARK L. REV. 231, 233, 239 (2005) (reporting that the Federal Circuit, in reviewing district court claim construction decisions, found that 34.5% of the terms were wrongly construed, and reversed, vacated and/or remanded the judgment due to claim construction errors in 29.7% of cases); David L. Schwartz, *Practice Makes Perfect? An Empirical Study of Claim Construction Reversal Rates in Patent Cases*, 107 MICH. L. REV. 223, 248-49 (2008) (reporting similar results).

⁸⁹Watt at 69 (5/4/09) (“[I]n too many cases we don’t know what the claims mean until the Federal Circuit speaks.”); *see also* Bessen at 47 (3/19/09) (“effectively, the boundaries of a patent are not clear and predictable until essentially the Federal Circuit decides what they are”); Menell at 31-32 (5/5/09) (describing a study in which panels of district court judges in simulated *Markman* hearings split evenly in their claim-construction decisions, even when reporting high confidence in their results).

B. Difficulties in Foreseeing Evolving Claims

A second aspect of obtaining notice is acquiring information about claims that might issue after the search. As one panelist explained, due to pending applications, “your search is necessarily out of date as of the date you searched it.”⁹⁰ Efforts to obtain notice can fail due to (i) unpublished patent applications and (ii) subsequent amendments to claims in published applications.

Patent examination takes an average of nearly three years from filing until the patent issues or the application is abandoned.⁹¹ Applicants are able to add or amend claims during the examination process, and they may do so to better cover rival products that they see in the marketplace.⁹² Moreover, applicants can, and frequently do, extend the examination process by filing for multiple, continued examinations, thereby increasing the time for amendments by years.⁹³ The sole constraint on the amendment process is that any new or amended claim must be sufficiently supported by the original specification.⁹⁴

Partial, but very valuable, notice is afforded by PTO publication of patent applications 18 months after filing, excluding those for which no foreign filing entailing such publication has

⁹⁰Yen at 87 (12/5/08).

⁹¹USPTO, Performance and Accountability Report Fiscal Year 2010, 18 (2010) (“2010 PTO Annual Report”), available at <http://www.uspto.gov/about/stratplan/ar/2010/USPTOFY2010PAR.pdf>; Schwartz at 15 (3/19/09) (“pendency . . . is a serious problem”).

⁹²37 C.F.R. §1.121 (2008) (explaining the manner in which amendments must be filed); *Kingsdown Med. Consultants, Ltd. v. Hollister, Inc.*, 863 F.2d 867, 874 (Fed. Cir. 1988) (declaring that it is not “in any manner improper to amend or insert claims intended to cover a competitor’s product the applicant’s attorney has learned about during the prosecution of a patent application,” provided that the amendment or insertion otherwise complies with all statutes and regulations).

⁹³USPTO, Patent Public Advisory Committee, Annual Report 11 (2008) (explaining that “an increased number of applications are being re-filed, after a final office action or during appeal,” and the continuing application “becomes assigned to an examiner and [is] re-examined again”); USPTO, *Changes to Practice for Continued Examination Filings*, 72 Fed. Reg. 46,716, 46,718 (Aug. 21, 2007) (reporting that continued examination filings (other than divisional applications) accounted for 29.4% of all filings in fiscal year 2006).

⁹⁴*See, e.g., PIN/NIP, Inc. v. Platte Chemical Co.*, 304 F.3d 1235, 1247-48 (Fed. Cir. 2002) (“While it is legitimate to amend claims or add claims to a patent application purposefully to encompass devices or processes of others, there must be support for such amendments or additions in the originally filed application.”); *TurboCare Div. of Demag Delaval Turbomachinery Corp. v. General Elec. Co.*, 264 F.3d 1111, 1118 (Fed. Cir. 2001) (“When the applicant adds a claim or otherwise amends his specification after the original filing date . . . the new claims or other added material must find support in the original specification.”).

been made.⁹⁵ Third parties can track patent applications, including amendments to claims, through the Patent Application Information Retrieval (PAIR) system. Panelists indicated that PAIR makes tracking the evolution of claims “very manageable” in some areas.⁹⁶ Even so, a number of panelists emphasized that notice is lacking as to applications without foreign filings or less than 18 months old,⁹⁷ and that surprises still occur when late amendments significantly shift the coverage of claims.⁹⁸

Panelists warned that claims can be amended in ways that cannot readily be predicted by reading the specification.⁹⁹ Such “redraft[ed] claims . . . are in effect hidden from the public.”¹⁰⁰ One panelist pointed to the “liberal amendment practice” that enables applicants to “misappropriat[e] by amendment,” i.e., to wait until “somebody does something, and then you amend your claims to cover it.”¹⁰¹ IT industry panelists in particular reported that the problem is

⁹⁵See 35 U.S.C. § 122(b) (2000). For other exceptions to publication, *see* 37 C.F.R. §§ 1.211(a) and 1.211(b).

⁹⁶McNelis at 120 (5/5/09); *see also* Watt at 61 (5/4/09) (due to the ability to “track applications in the Patent Office . . . [T]here’s very little surprise anymore”); Miller at 201 (3/18/09); Kappos at 259 (3/19/09) (PAIR works well for following a single application); Messinger at 259 (3/19/09) (“when [PAIR’s] up, it works great”).

⁹⁷See Phillips at 202 (3/18/09) (“I do worry about those applications filed in the U.S. only”); Harris at 123-24 (3/18/09) (unpublished claims pose a problem); Yen at 87 (12/5/08).

⁹⁸See Messinger at 234 (3/19/09) (noting difficulty when “all of a sudden . . . for some surprise turn of events, they go in a very different direction that is very broad compared to the original filing”). *Laryngeal Mask Co. v. Ambu A/S*, 618 F.3d 1367 (Fed. Cir. 2010), provides a recent example. The Federal Circuit reversed a finding that the patentee’s competitor did not infringe because its laryngeal mask airway device lacked a “tube joint.” Until “[j]ust prior to issuance,” the claims had contained language requiring a tube joint, but the applicant deleted that language “during the final phase of prosecution.” *Id.* at 1371-72. Although the specification was “replete with discussion of a tube joint,” *id.* at 1371, the Federal Circuit found that the specification merely described a preferred embodiment and did not limit the claim.

⁹⁹See, e.g., Meurer at 211 (12/5/08) (“Hidden boundary information caused by continuation practice is a big problem.”); Merges at 265-66 (5/4/09); *cf.* Kushan at 268 (12/5/08) (noting that many people outside biotech have experienced the problem that “claims morph over time, and eventually have no tie to what is actually invented”).

¹⁰⁰Bessen at 47 (3/19/09).

¹⁰¹Merges at 266 (5/4/09); *see also* Lee at 121 (5/5/09) (noting that non-practicing entities may acquire an application and then “file continuations and mine them” by amending claims to read on others’ products); Schwartz at 13 (3/19/09) (describing this as the most “pernicious form” of continuation practice).

magnified when an applicant uses repeated continuations to greatly extend the examination process.¹⁰²

On the other hand, panelists from the life sciences indicated that they are “very capable of reading a specification [in an application] and being able to tell what kind of claims might come out.”¹⁰³ They attribute this in part to strict application of the written description and enablement requirements in that sector.¹⁰⁴ While acknowledging that there is no “risk-free path”¹⁰⁵ and noting the presence of the occasional “contrary example,”¹⁰⁶ they conveyed the overall message that “there really are no secrets out there anymore with everything being published.”¹⁰⁷

Panelists from other industries affirmed their ability to make “decent” predictions regarding the claims that would result from published patent applications.¹⁰⁸ In general, their message was that the task, while not necessarily easy, was manageable. One panelist explained that predicting the claims that will result from applications is “a very important part of our job,” albeit “not real fun.”¹⁰⁹ Another added the caveat that “you’re being your own examiner” when predicting the course an application will take; “you have to figure it out,” she continued, without “getting any predictability out of the Patent Office.”¹¹⁰

¹⁰²See, e.g., Slifer at 118-19 (3/18/09); Lee at 114 (5/5/09) (after repeated continuations, the issued claims may “look nothing like” the original claims); Massaroni at 192-93 (2/12/09).

¹⁰³Shafmaster at 235 (3/18/09).

¹⁰⁴See Shema at 26, 60-61 (5/4/09) (enforcement of the disclosure requirements “really helps us to analyze the scope of the claims that [other applications will] get out of the Patent Office and that will survive in a court challenge”); Kushan at 249 (12/5/08) (stating that there is “decent law now on written description [and] on enablement that we can draw upon to determine whether . . . there’s actually a risk” from an application).

¹⁰⁵Myers at 234 (3/18/09).

¹⁰⁶Watt at 61-62 (5/4/09) (stating that “there’s very little surprise anymore” but noting the “contrary example” where a competitor, “changed direction” after prosecuting more limited claims for “many years” and ultimately was able to obtain claims that arguably covered Amgen’s product; Amgen, after previously investing a billion dollars, monitored the process through PAIR, saw the broader patent coming, and “fortunately . . . a license was available”).

¹⁰⁷Bright at 67 (5/4/09).

¹⁰⁸Horton at 200 (3/18/09) (GE’s ability to predict the claims that will evolve from an application is “decent,” despite “some degree of uncertainty”).

¹⁰⁹Phillips at 202 (3/18/09); see also Miller at 201 (3/18/09) (“[W]e kind of know how things are happening . . .”).

¹¹⁰Stec at 200 (3/18/09).

C. Difficulties in Sifting Through a Multitude of Patents

Effective notice also requires that a firm be able to identify and review the patents and patent applications that might cover its products. A variety of online databases of patents and published applications can be searched for this purpose, e.g., using text terms or the PTO classification system.¹¹¹ Even with these automated mechanisms, however, efficient and effective searches in some industries are hampered by the sheer number of potentially relevant patents/applications, the inability of search criteria to reliably identify relevant patents, and the limited time available for search. Again, in other industries, clearance search may be quite manageable.

Hearing testimony described how, in the IT and telecommunications industries, it is “almost cost prohibitive” to perform clearance searches, and explained that searches are likely to produce “false positives and false negatives.”¹¹² Panelists identified a virtual perfect storm of difficulties. IT and telecommunications products typically contain many different components or features that are themselves covered by patents.¹¹³ Many representatives of firms from these industries viewed the “sheer numbers” of potentially applicable patents as a primary obstacle to reliable clearance.¹¹⁴

Adding to the challenge, many features are embodied in components supplied by other manufacturers. One panelist posed the issue starkly: “Nobody at Palm knows anything about the

¹¹¹Searches can be performed using the PTO’s free full-text database, other free search services, or fee-based search services. *See* Pharmaceutical Research and Manufacturers of America Comment at 35 (2/10/09).

¹¹²Krall at 114 (3/18/09).

¹¹³ *See, e.g.*, Doyle at 162 (5/5/09) (stating that a Palm product incorporates 800-1,000 components); Simon at 201-02 (2/11/09) (noting that at least 1,500 patents cover a single Intel microprocessor); Software & Information Industry Association Comment at 4 (2/5/09) (speaking in terms of “hundreds or even thousands of components” in a product).

¹¹⁴Thorne at 117 (3/18/09) (terming “sheer numbers” the “number one” problem); *see also* Sarboraria at 120 (3/18/09) (same); Phelps at 263 (5/4/09) (same); Luftman at 143, 213 (2/12/09); Yen at 53-54 (12/5/08) (noting that the “sheer quantity” of issued patents in IT contributes to making it “impossible to achieve any degree of certainty by . . . clearance searches”); Slifer at 118 (3/18/09) (stating that Micron has “literally thousands of potential patents to read”); Doyle 162 (5/5/09) (stating that Palm’s product arguably implicates “hundreds if not thousands of patents, most of which would be very hard for us to identify from the start”); Computer and Communications Industry Association Comment at 12 (2/5/09); Software & Information Industry Association Comment at 5 (2/5/09) (“With this myriad of often-overlapping patents, no technology business can review every potentially relevant patent before designing and commercializing a new product.”).

[purchased] chip other than what it ultimately will do We are not qualified to say whether or not Palm infringes or the supplier of that chip infringes.”¹¹⁵

The lack of predictable vocabularies in IT arts also complicates efforts to efficiently sift through large numbers of patents. In areas such as software, a panelist lamented, “there’s so many different ways to describe similar features.”¹¹⁶ Panelists explained that “it is impossible to achieve any degree of certainty by clearance searches with today’s systems.”¹¹⁷ Vague or stretched claims might “never [be] found doing any type of searching.”¹¹⁸

Finally, panelists observed that high tech product cycles are very short, leaving minimal time for conducting a search.¹¹⁹ Indeed, one commenter pointed out that software innovations “evolve over a period of months,” much more quickly than patent applications can be examined even in the best of circumstances.¹²⁰

In stark contrast, patent clearance seemingly poses few problems in the chemical and pharmaceutical industries.¹²¹ The number of relevant patents is much smaller, perhaps only “a couple dozen.”¹²² The ability to focus on so few patents is largely attributable to the clarity with which inventions involving small molecule chemicals can be described.¹²³ And, in

¹¹⁵See Doyle at 225 (5/5/09). Testimony from other industries indicated that, for purchased components, firms often must rely on clearance performed by their suppliers. See Stec at 178 (3/18/09) (adding “it’s almost impossible for [Ford] to go out and understand what the patent landscape is for all of the various intricate parts that end up in a vehicle”).

¹¹⁶McNelis at 26 (5/5/09); *see also* Horton at 175 (3/18/09) (noting that in software, “[e]ach of us could describe it in almost a different way,” complicating automated searching).

¹¹⁷Yen at 53-54 (12/5/08). One panelist opined that only “rough tools” are available to perform searches. Menell at 30 (5/5/09).

¹¹⁸Luftman at 221 (2/12/09); *see also* Sarboraria at 120 (3/18/09) (Oracle finds that “patents are asserted against us . . . that never came up through [a] very diligent [search] process”).

¹¹⁹See Lee at 111 (5/5/09); *cf.* Horton at 196 (3/18/09) (noting the impact of variation in product cycles on patent search).

¹²⁰Michael F. Martin Comment at 13 (5/15/09).

¹²¹Armitage at 120 (3/19/09) (stating that “the notice requirement, by and large, is very well met in the current system”); Phillips at 176 (3/18/09).

¹²²Myers at 241-42 (3/18/09); *see also* Armitage at 210 (2/12/09) (indicating that there are vastly more patents in high tech than in pharmaceuticals, where some multi-billion dollar products are covered by just one or two patents).

¹²³See Menell at 29 (5/5/09); Horton at 174 (3/18/09); Hall at 264 (5/4/09); Vermont at 221 (4/17/09); Durie at 17-18 (5/5/09).

pharmaceuticals, there is a very long product development period over which search can be staged, due mainly to the lengthy FDA testing process.¹²⁴

In biotechnology, panelists reported that, although they face significant challenges, effective clearance searches are the norm.¹²⁵ While “potentially thousands of patents come up on our searches,”¹²⁶ testimony suggested that “it is generally reasonably easy to ascertain at least [what the] universe of potentially blocking patents for a particular technology might be.”¹²⁷ Moreover, in “biotech . . . [there’s] a very standardized vocabulary” that is “very easily searchable.”¹²⁸ As in the case of pharmaceuticals, there is substantial development time, during which the search process can be staged.¹²⁹ Testimony regarding medical device industries portrayed a similar picture – effective clearance searches despite large numbers of potentially relevant patents where long life cycles afforded the opportunity for extensive clearance efforts.¹³⁰

IV. POSSIBLE NOTICE ENHANCEMENTS

Notice is affected by a variety of patent doctrines and practices. This section looks in a number of directions for possible notice improvements while recognizing the trade-offs inherent in the analysis.

Cost is obviously important. Resource constraints compel a search for ways to elicit necessary information without imposing undue costs. Often, patent applicants are best-positioned to supply low-cost, but very valuable, enhancements.

Timing is another key consideration. To the extent feasible, earlier is better for notice purposes.¹³¹ In particular, notice is more beneficial to third parties when they are still planning

¹²⁴See Myers at 221 (3/18/09) (it can take “ten years from discovery to approval” for a new drug, due largely to FDA safety and efficacy review).

¹²⁵See, e.g., Singer at 244 (3/18/09); Norviel at 13 (5/5/09) (“we can go through thousands of patents and we can figure out if there’s a problem or not”).

¹²⁶Shafmaster at 241 (3/18/09).

¹²⁷Durie at 17 (5/5/09).

¹²⁸Cockburn at 219 (4/17/09).

¹²⁹Shafmaster at 244-45 (3/18/09).

¹³⁰See Jensen at 243-44 (3/18/09) (describing medical devices as “stickier” products, with longer life cycles that “give[] you the runway to do the clearance search” despite large numbers of potentially relevant patents).

¹³¹Many of the panelists emphasized the importance of receiving notice at an early date. See, e.g., Lee at 43 (5/5/09) (“the earlier the better”); Kunin at 137 (3/19/09) (“a front-end solution makes the most

their R&D strategies and before they make sunk investments that may expose them to hold-up.¹³² Several panelists emphasized the desirability of eliminating ambiguity during, or promptly after, examination.¹³³ Accordingly, many of the suggested improvements look to the examination process and the handling of applications within the PTO, rather than to litigation.¹³⁴

Trade-offs between notice and scope pose particularly thorny issues. Insisting on very specific, explicit written descriptions, requiring great precision when evaluating claim definiteness, even confining applicants to original, published claims all might give third parties better notice but may not fully protect all that applicants have invented. This section highlights these trade-offs to afford a better understanding of their notice implications.

Divergence in the extent and nature of notice problems among industries also poses challenges. This section looks for ways to improve notice in problem areas without impairing the patent system elsewhere and without sacrificing the benefits of a unitary patent system, with doctrines applicable across all technologies and industries.

With these guideposts in mind, this section considers in sequence (1) possible steps for improving the ability of the public – in particular, third party competitors and potential users of the technology – to understand existing claims; (2) possible steps for improving the public’s ability to foresee evolving claims; and (3) possible steps for improving the public’s ability to sift through a multitude of patents and patent applications.

sense”); Rea at 141 (3/19/09) (“as early as possible”); *id.* at 223 (3/19/09); Durie at 44-45 (5/5/09); Schultz at 70-71 (5/5/09); Schwartz at 15 (3/19/09) (“the longer you don’t know what the claim is going to cover, the more trouble you are in”). *But cf.* Armitage at 186 (3/19/09) (cautioning that “you understand a claim in context”); Messinger at 222 (3/19/09) (“courts have recognized that it’s very hard to do claim construction without an accused product”).

¹³²See, e.g., Cotropia at 136 (3/19/09) (arguing that front-end solutions are needed if the concern is impact on R&D investment decisions); Lee at 44 (5/5/09) (contending that dealing with inadvertent infringement after businesses have invested a lot of money and a product has launched is “tremendously costly” and “a disservice to the public and to subsequent [independent] inventors”).

¹³³See, e.g., Cotropia at 125-26 (3/19/09) (early resolution of ambiguity helps everyone, not just the litigants); Phillips at 177 (3/18/09) (terming absence of a mechanism short of litigation for testing “what a patent really covers” a “fundamental failing . . . of the U.S. patent system”).

¹³⁴A few panelists reasoned that because most patents never become economically significant, an efficient process would first sort out those that do. The few that prove significant could then receive special attention, ensuring their validity and clarifying their scope. See Burk at 41 (5/5/09) (“there needs to be some sorting process to figure which ones you want to fight about”); Badenoch at 112-13 (2/12/09); see generally Mark A. Lemley, *Rational Ignorance at the Patent Office*, 95 NW. L. REV. 1495, 1497 (2001) (arguing that it is much cheaper to make detailed validity determinations in the few cases in which patents are asserted against competitors than to expend resources examining patents “that will never be heard from again”). The argument’s strength may vary with the relevant costs: for notice improvements that require relatively little expense, it likely is less telling.

A. Improving the Ability to Understand Existing Claims: Indefiniteness

1. Background and Hearing Record

Section 112, second paragraph of the Patent Act, 35 U.S.C. § 112, states the role of patent claims:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.¹³⁵

Claims that do not conform to this statutory requirement are invalid on grounds of “indefiniteness.”

The Supreme Court has long recognized that prohibiting indefinite claims serves a vital notice function:

The statute seeks to guard against unreasonable advantages to the patentee and disadvantages to others arising from uncertainty as to their rights. The inventor must inform the public during the life of the patent of the limits of the monopoly asserted, so that it may be known which features may be safely used or manufactured without a license and which may not.¹³⁶

The Court subsequently elaborated, “A zone of uncertainty which enterprise and experimentation may enter only at the risk of infringement claims would discourage invention only a little less than unequivocal foreclosure of the field.”¹³⁷

The Court of Customs and Patent Appeals and the Federal Circuit, in its early decisions, frequently spoke in similar terms. Thus, a CCPA opinion found claims definite because they “do define the metes and bounds of the claimed invention with a reasonable degree of precision and particularity,” so that “[o]ne skilled in the art would have no difficulty determining whether or not a particular collection of components infringed”¹³⁸ Likewise, many of the early Federal

¹³⁵Although the statute refers to claims as part of the specification, common, informal usage applies the term “specification” to the application’s written description of the invention, as distinguished from the claims. *See In re Dossel*, 115 F.3d 942, 945 (Fed. Cir. 1997). This chapter adopts that convention.

¹³⁶*General Elec. Co. v. Wabash Appliance Corp.*, 304 U.S. 364, 369 (1938) (discussing a predecessor to the current indefiniteness statute) (footnotes and internal citation omitted).

¹³⁷*United Carbon Co. v. Binney & Smith Co.*, 317 U.S. 228, 236 (1942).

¹³⁸*In re Venezia*, 530 F.2d 956, 958-59 (C.C.P.A. 1976).

Circuit opinions framed the indefiniteness discussion in terms of, or similar to, “whether a claim reasonably apprises those of skill in the art of its scope.”¹³⁹

While continuing to describe the ultimate issue using notice-oriented language regarding what those with skill in the art would understand,¹⁴⁰ the Federal Circuit shifted focus with its 2001 *Exxon Research* opinion. Observing that courts frequently deal with “close questions of claim construction,” the Federal Circuit reasoned that a claim should not be indefinite merely because it poses such an issue. The test for indefiniteness, the court concluded, should not be whether claims are “plain on their face” but rather whether they are “amenable to construction, however difficult that task may be.”¹⁴¹ The Federal Circuit continued,

If a claim is insolubly ambiguous, and no narrowing construction can properly be adopted, we have held the claim indefinite. If the meaning of the claim is discernible, even though the task may be formidable and the conclusion may be one over which reasonable persons will disagree, we have held the claim sufficiently clear to avoid invalidity on indefiniteness grounds.¹⁴²

“By finding claims indefinite only if reasonable efforts at claim construction prove futile,” the court explained, “we accord respect to the statutory presumption of patent validity, and we protect the inventive contribution of patentees, even when the drafting of their patents has been less than ideal.”¹⁴³ Numerous subsequent Federal Circuit opinions have repeated the “insolubly ambiguous” language, applying it with varying degrees of rigor.¹⁴⁴

¹³⁹*In re Warmerdam*, 33 F.3d 1354, 1361 (Fed. Cir. 1994); *see, e.g.*, *Morton Int’l, Inc. v. Cardinal Chem. Co.*, 5 F.3d 1464, 1470 (Fed. Cir. 1993) (finding claims indefinite because they were “not sufficiently precise to permit a potential competitor to determine whether or not he is infringing”); *Amgen v. Chugai Pharm. Co.*, 927 F.2d 1200, 1217 (Fed. Cir. 1991); *Shatterproof Glass Corp. v. Libbey-Owens Ford Co.*, 758 F.2d 613, 624 (Fed. Cir. 1985).

¹⁴⁰*See Exxon Research & Eng’g Co. v. United States*, 265 F.3d 1371, 1375 (Fed. Cir. 2001) (stating, “If one skilled in the art would understand the bounds of the claim when read in light of the specification, then the claim satisfies section 112, paragraph 2.”).

¹⁴¹*Id.*

¹⁴²*Id.*

¹⁴³*Id.* (citation omitted).

¹⁴⁴*See, e.g.*, *Hearing Components, Inc. v. Shure, Inc.*, 600 F.3d 1357 (Fed. Cir. 2010); *Ultimax Cement Mfg. Corp. v. CTS Cement Mfg. Corp.*, 587 F.3d 1339, 1350-53 (Fed. Cir. 2009); *Praxair, Inc. v. ATMI, Inc.*, 543 F.3d 1306, 1319-21 (Fed. Cir. 2008); *Xerox Corp. v. 3Com Corp.*, 458 F.3d 1310, 1323 (Fed. Cir. 2006); *Energizer Holdings, Inc. v. Int’l Trade Comm’n*, 435 F.3d 1366 (Fed. Cir. 2006); *Bancorp Servs., LLC v. Hartford Life Ins. Co.*, 359 F.3d 1367 (Fed. Cir. 2004) (all finding that claims were not indefinite). The court’s recent decision in *Enzo Biochem, Inc. v. Applera Corp.*, 599 F.3d 1325 (Fed. Cir. 2010) (finding that claims were not indefinite), *petition for cert. filed*, 79 U.S.L.W. 3228 (U.S. Sept. 23,

Several of the panelists suggested that a more rigorous standard is needed in order to fulfill notice goals. One urged, “[An] easy thing for us to do is take the definiteness requirement seriously . . . ‘insolubly ambiguous’ is a disaster.”¹⁴⁵ For another, tightening the indefiniteness standard was a “no-brainer.”¹⁴⁶ A number of others concurred, at least with regard to consideration of claim definiteness by the PTO.¹⁴⁷

In fact, both the PTO and the Federal Circuit recently have added teeth to enforcement of the indefiniteness standard. The PTO’s Board of Patent Appeals and Interferences cut broadly in its decision in *Ex Parte Miyazaki*.¹⁴⁸ Stressing that the PTO had a “duty to guard the public against patents of ambiguous and vague scope,” the Board determined that the PTO was justified in employing a “lower threshold of ambiguity when reviewing a pending claim for indefiniteness than those used by post-issuance reviewing courts.”¹⁴⁹ During prosecution, the Board explained, applicants still had an opportunity to amend their claims to overcome concerns with indefiniteness. Consequently, the Board ruled,

[R]ather than requiring that the claims are insolubly ambiguous, we hold that if a claim is amenable to two or more plausible claim constructions, the USPTO is justified in requiring the applicant to more precisely define the metes and bounds of the claimed invention by holding the claim unpatentable under 35 U.S.C. § 112, second paragraph, as indefinite.¹⁵⁰

2010) (No. 10-426), favorably referenced “insolubly ambiguous” principles in an aside, 599 F.3d at 1332 (“if a claim is indefinite, the claim by definition cannot be construed”), but analyzed the claims under a more exacting inquiry – “whether those skilled in the art would understand what is claimed.” *Id.* Cases finding indefiniteness under the “insolubly ambiguous” standard include *Halliburton Energy Servs., Inc. v. M-I, LLC*, 514 F.3d 1244, 1256 (Fed. Cir. 2008) (finding the limitation “fragile gel” indefinite because, while the specification identified qualities necessary for fragility, a person of ordinary skill in the art would not be able to determine the degree to which those qualities would have to be present); *Datamize, LLC v. Plumtree Software, Inc.*, 417 F.3d 1342, 1348-56 (Fed. Cir. 2005) (finding the phrase “aesthetically pleasing” indefinite); and *Honeywell Int’l, Inc. v. Int’l Trade Comm’n*, 341 F.3d 1332 (Fed. Cir. 2003).

¹⁴⁵Meurer at 262 (12/5/08).

¹⁴⁶Vermont at 201 (4/17/09).

¹⁴⁷See, e.g., Shema at 71-72 (5/4/09); Wagner at 200 (4/17/09); Rea at 172-73 (3/19/09); Kappos at 173 (3/19/09) (suggesting that current doctrine is adequate, but we need to “apply it more”).

¹⁴⁸89 U.S.P.Q. 2d 1207, 2008 WL 5105055 (Bd. Pat. App. & Interf. 2008).

¹⁴⁹2008 WL 5105055, at *5-6.

¹⁵⁰*Id.* at *5. The Board’s ruling followed shortly after the PTO’s Deputy Commissioner for Patent Examination Policy had rendered similar advice to the PTO’s examining corps. See Memorandum from John Love, Deputy Commissioner for Patent Examination Policy, USPTO, to Technology Center

Some of the panelists gave *Miyazaki* considerable praise. “I do like the Miyazaki case,” one stated, adding, “[I]t actually was very, very good”¹⁵¹ “[T]hat case, in my view, is exactly pointed in the right direction,” added another.¹⁵² Others spoke more generally in favor of enhanced indefiniteness enforcement at the PTO level.¹⁵³ One panelist voiced concern that indefiniteness rejections should not substitute for developing a record that shows what a claim means, but agreed, nonetheless, that indefiniteness rulings could be a useful backstop.¹⁵⁴

The Federal Circuit’s recent steps against indefiniteness have tended to focus more narrowly, via a series of rulings finding computer-implemented means-plus-function claims indefinite.¹⁵⁵ In each case the invalidated claims covered a function implemented by means of a computer or microprocessor, but the specification provided no details regarding the structure of the relevant program.¹⁵⁶ The court ruled that because the specification failed to provide some form of algorithm for performing the claimed function – not necessarily anything highly detailed

Directors and Patent Examining Corps, Indefiniteness Rejections Under 35 U.S.C. § 112, Second Paragraph, at 2 (Sept. 2, 2008), available at <http://www.uspto.gov/patents/law/exam/memoranda.jsp>.

¹⁵¹Rea at 173, 183 (3/19/09).

¹⁵²Kappos at 182 (3/19/09); see also IBM Comment at 6 (2/12/09) (terming the *Miyazaki* standard “appropriate”).

¹⁵³See, e.g., Rai at 181 ((3/19/09) (indefiniteness rulings a useful backstop in case the give and take during examination does not produce the necessary information); Menell at 53-54 (5/5/09) (arguing that the PTO is the place to inculcate definiteness values). But see Messinger at 172 (3/19/09) (arguing that the PTO should only find indefiniteness “in extreme situations”).

¹⁵⁴Cotropia at 177-80, 181-82 (3/19/09).

¹⁵⁵Means-plus-function claims – “expressed as a means or step for performing a specified function without the recital of structure, material, or acts in support thereof” – are specifically governed by Section 112, sixth paragraph, of the Patent Act. 35 U.S.C. § 112. Under that provision, means-plus-function claiming involving a combination of elements is allowed, and the claims are construed “to cover the corresponding structure, material, or acts described in the specification and equivalents thereof.” *Id.* Thus, the specification must describe at least one means of performing the claimed function.

¹⁵⁶See *Blackboard, Inc. v. Desire2Learn, Inc.*, 574 F.3d 1371, 1382-86 (Fed. Cir. 2009); *Net Moneyin, Inc. v. Verisign, Inc.*, 545 F.3d 1359, 1365-68, 1382-86 (Fed. Cir. 2008); *Finisar Corp. v. DirectTV Group*, 523 F.3d 1323, 1339-41 (Fed. Cir. 2008); *Aristocrat Techs. Austl. PTY, Ltd. v. Int’l Game Tech.*, 521 F.3d 1328 (Fed. Cir. 2008). A very recent Federal Circuit opinion distinguished between means-plus-function claims that involve “specific function[s] performed by a special purpose computer” and those that “simply recite[] . . . claimed functions . . . [that] can be achieved by any general purpose computer without special programming”; the court required that the specification disclose some form of algorithm only for the former. See *In re Katz*, Nos. 2009-1450-52, 2009-1468-69, & 2010-1017, 2011 WL 607381 at *5-8 (Fed. Cir. Feb. 18, 2011).

– the applicant had not disclosed sufficient structure to satisfy Section 112, paragraph 6, thereby rendering the claims indefinite under Section 112, paragraph 2.¹⁵⁷

2. Analysis

Both the PTO's *Miyazaki* analysis and the Federal Circuit's recent handling of computer-implemented means-plus-function claims are important steps toward enhanced public notice.¹⁵⁸ We address each in turn.

Problems posed by multiple reasonable interpretations. Claims that clearly delineate a patent's scope are essential for meaningful third-party notice. An indefiniteness standard that weeds out claims reasonably susceptible to multiple interpretations could reduce ambiguity in a broad range of settings.¹⁵⁹ Allowing multiple potential constructions to persist adds a penumbra to a patent's scope, discouraging rivals from entering where, with clearer notice, they could safely operate. When implemented during PTO review, indefiniteness rulings promptly remove that penumbra, releasing business planning from being held hostage and requiring only a claim amendment from the party best able to add clarity.¹⁶⁰ When implemented in court, however, the costs may be higher and the benefits later and more attenuated.

¹⁵⁷In keeping with these rulings, the PTO recently highlighted to its examiners the requirement that the specification provide adequate structure to support such claims under both the indefiniteness and enablement requirements. See Memorandum from John Love, Deputy Commissioner for Patent Examination Policy, USPTO, to Technology Center Directors and Patent Examining Corps, Rejections under 35 U.S.C. 112, Second Paragraph, When Examining Means (or Step) Plus Function Claim Limitations under 35 U.S.C. 112, Sixth Paragraph, at 2-4 (Sept. 2, 2008), available at <http://www.uspto.gov/patents/law/exam/memoranda.jsp>.

¹⁵⁸One commentator, after surveying these developments, as well as the *Datamize* and *Halliburton* cases in which the Federal Circuit found claims indefinite under the “insolubly ambiguous” standard, concludes that indefiniteness “has, in the course of the past few years, become both the courts’ and the PTO’s weapon of choice in the battle to guard the public against patents of ambiguous or vague scope.” David A. Kelly, *Indefiniteness Invalidations Continue to Rise Sharply in 2008*, 77 PAT. TRADEMARK & COPYRIGHT J. 576 (2009) (finding that district court indefiniteness rejections rose 350% in the 42 months following the August 2005 *Datamize* opinion, compared to the preceding 42 months).

¹⁵⁹See Rea at 172 (3/19/09) (urging that indefiniteness analysis “should apply to all forms of ambiguity affecting the breadth”); *Halliburton*, 514 F.3d at 1249 (noting application of the indefiniteness doctrine to settings involving means-plus-function elements lacking corresponding structure in the specification; numeric limitations that fail to disclose which of multiple methods of measurement should be used; terms wholly dependent on subjective opinion; and terms that lack a proper antecedent basis); *Bancorp Services*, 359 F.3d at 1371-76 (applying indefiniteness doctrine to undefined terms); *Seattle Box Co. v. Indus. Crating & Packing, Inc.*, 731 F.2d 818 (Fed. Cir. 1984) (applying indefiniteness doctrine to words of degree).

¹⁶⁰See Kappos at 163 (3/19/09) (describing the applicant as “the lowest cost-avoider of confusion and ambiguity”).

Miyazaki approaches indefiniteness with a focus on notice: when multiple meanings are reasonably possible, the claim may be rejected as indefinite. In contrast, the “insolubly ambiguous” standard accepts substantial ambiguity and preserves claims that require a court to make hard choices among varying interpretations.¹⁶¹ As variously elaborated by the Federal Circuit, definiteness depends on whether “reasonable efforts at claim construction prove futile”¹⁶² or “[claim] terms can be given any reasonable meaning.”¹⁶³ The first formulation tends to ascribe to the PHOSITA the full ability of the court of appeals to resolve issues of claim construction,¹⁶⁴ overstating what third parties making marketplace decisions are likely to understand; the second formulation provides little notice of scope when multiple “reasonable meaning[s]” are present.¹⁶⁵ To the extent our measure is the public’s ability to plan rationally based on an understanding of the claims – to know “the limits of the monopoly asserted” and “which features may be safely used or manufactured without a license and which may not”¹⁶⁶ – the *Miyazaki* approach is preferable.

The fact that *Miyazaki*’s more stringent standard applies only for purposes of patent prosecution and PTO review pays heed to the Federal Circuit’s *Exxon Research* rationale. Requiring “insoluble ambiguity,” the court explained, “accord[s] respect to the statutory presumption of patent validity.”¹⁶⁷ That presumption, however, applies only to issued patents; the PTO’s more stringent standard for patents still subject to agency review adds assurance that issued patents are indeed worthy of the presumption. Moreover, the Federal Circuit designed its standard to “protect the inventive contribution of patentees, even when the drafting of their patents has been less than ideal.”¹⁶⁸ The court spoke in a litigation setting, where a finding of

¹⁶¹Some panelists portrayed such hard choices as the rule in litigated cases: “[I]t is the very rare case where there is not a potentially dispositive claim construction issue that absolutely could go either way” Durie at 45 (5/5/09).

¹⁶²*Exxon Research*, 265 F.3d at 1375.

¹⁶³*Datamize*, 417 F.3d at 1347.

¹⁶⁴*See generally Exxon Research*, 265 F.3d at 1375 (refusing to find a claim indefinite “merely because it poses a difficult issue of claim construction” and noting that cases “frequently present close questions of claim construction on which expert witnesses, trial courts, and even the judges of this court may disagree”).

¹⁶⁵*See Enzo Biochem, Inc. v. Applera Corp.*, 603 F.3d 1347, 1348 (Fed. Cir. 2010) (Plager, J., dissenting from denial of a petition for rehearing) (explaining that “it is not until three court of appeals judges . . . pick the ‘right’ interpretation that the public, not to mention the patentee and its competitors, know what the patent actually claims”), *petition for cert. filed*, 79 U.S.L.W. 3228 (U.S. Sept. 23, 2010) (No. 10-426).

¹⁶⁶*General Electric*, 304 U.S. at 369.

¹⁶⁷*Exxon Research*, 265 F.3d at 1375.

¹⁶⁸*Id.*

indefiniteness invalidates the patent. But while an application is still under PTO review, indefiniteness can be rectified by a claim amendment. In other words, drafting can be perfected, and third parties notified, while still protecting “the inventive contribution of patentees.”

Problems posed by functional claiming. The Federal Circuit’s recent tightening of indefiniteness standards for computer-implemented means-plus-function claims begins to deal with one aspect of functional claiming and presents a much-needed opportunity to enhance notice regarding software patents, a goal consistently urged by panelists.¹⁶⁹ The degree to which the recent rulings will promote useful notice, however, will depend on still-unsettled details regarding the nature and extent of the necessary disclosure.¹⁷⁰ To this point, the Federal Circuit has required that a patent’s specification contain an “algorithm” – some explanation of how the computer performs the claimed function – to support a means-plus-function element in a claim. But the court has indicated that that algorithm may be expressed “in any understandable terms including as a mathematical formula, in prose, or as a flow chart, or in any other manner that provides sufficient structure” when viewed from the perspective of “one of ordinary skill in the art.”¹⁷¹ No source code or “highly detailed description” has been required.¹⁷²

Notice objectives counsel that as the courts elaborate the law regarding required descriptions of means to perform a stated function, they seek ways to reduce the “zone of uncertainty which enterprise and experimentation may enter only at the risk of infringement.”¹⁷³ General statements that fail to explain how the computer performs the claimed functions may leave the outer boundaries of the claim difficult to decipher.¹⁷⁴ Adequate notice, in contrast, requires particular and distinct claiming of the subject matter that the applicant regards as the invention. To provide that notice, any “algorithm” relied upon as structure supporting a means-plus-function claim must identify the sequence of steps that the computer will perform in sufficient detail to disclose what is within and what is outside of the patent.

¹⁶⁹*See supra* Section III.

¹⁷⁰The impact of this line of cases also will depend on the frequency with which claims continue to be framed in means-plus-function formats under Section 112, paragraph 6. *See BESSEN & MEURER, supra* note 16, at 211-12 (terming the recent line of cases requiring disclosure of an algorithm a “step in the right direction” but noting that “the broad and uncertain range of mathematical equivalents to algorithms” and the ability to avoid use of means-plus-function language may limit its practical value).

¹⁷¹*Finisar*, 523 F.3d at 1340 (internal citation omitted).

¹⁷²*Aristocrat*, 521 F.3d at 1338.

¹⁷³*United Carbon*, 317 U.S. at 236.

¹⁷⁴*See Halliburton Oil Well Cementing Co. v. Walker*, 329 U.S. 1, 12 (1946) (warning about the potential ambiguity of functional claims).

Of course, claims may be functionally stated without invoking the special means-plus-function rules.¹⁷⁵ By addressing means-plus-function claims, the Federal Circuit has confronted just a subset of the issues raised by functional claiming. As discussed above, hearing testimony repeatedly suggested that functional claiming generates uncertainty and impairs notice.¹⁷⁶ Problems may be especially severe with “results-based claiming,” i.e., “claiming the effect of what was done rather than what was actually created.”¹⁷⁷ Particularly in software contexts, the Federal Circuit has been criticized for allowing patents that “claim the function itself” with “little or no description of how to achieve this function,” often covering later-developed technologies that “seem to bear only a passing resemblance to what the inventor originally built or described.”¹⁷⁸ In contrast, panel testimony suggested that where functional claiming has been adequately supplemented with structural information, in the claim or the specification, notice is substantially improved.¹⁷⁹ The same concern for affording notice of claim boundaries that has encouraged the Federal Circuit to begin addressing computer-implemented means-plus-function claims, should similarly impel greater attention and lend greater weight to the patent system’s notice function when evaluating the definiteness of other functional claims.¹⁸⁰

Recommendations. The Commission applauds the recent use of the indefiniteness standard by the PTO and Federal Circuit to enhance patent notice. In assessing indefiniteness, the PTO should adhere to the principle articulated in *Miyazaki*, that “if a claim is amenable to two or more plausible claim constructions, the USPTO is justified in requiring the applicant to more precisely define the metes and bounds of the claimed invention by holding the claim unpatentable under 35 U.S.C. § 112, second paragraph, as indefinite.” The Commission further recommends that courts pay close heed to notice objectives as they further explicate the

¹⁷⁵See, e.g., ROBERT P. MERGES & JOHN F. DUFFY, PATENT LAW AND POLICY: CASES AND MATERIALS 334 (3d ed. 2002) (discussing “functional language” that is “outside § 112, ¶ 6); MPEP § 2181.

¹⁷⁶See *supra* notes 72-77 and accompanying text.

¹⁷⁷Kappos at 174 (3/19/09) (terming such claiming “a big problem in the IT arts”).

¹⁷⁸See DAN L. BURK & MARK A. LEMLEY, THE PATENT CRISIS AND HOW THE COURTS CAN SOLVE IT 61-62 (2009).

¹⁷⁹See Shema at 60-61 (5/4/09) (the fact that in biotech “you can’t just claim things functionally, you’ve got to claim things structurally . . . really helps us to analyze the scope of the claims that [competitors] will get”).

¹⁸⁰Cf. Mark D. Janis, *Who’s Afraid of Functional Claims? Reforming the Patent Law’s § 112, ¶ 6 Jurisprudence*, 15 SANTA CLARA COMPUTER & HIGH TECH. L. J. 231, 297 (1999) (urging that a “fine tuned” application of the general (viz., Section 112, Paragraph 2) indefiniteness doctrine, coupled with adequate disclosure, could deal with any clarity concerns by requiring linkages between functional claims and corresponding disclosure in the specification, without need for special treatment of means-plus-function claims). The detailed discussion of functional claims in the PTO’s newly issued Supplementary Examination Guidelines, 76 Fed. Reg. at 7164-65, 7170-72, may already herald increased attention to such claims at the administrative level.

circumstances in which a patent's specification sufficiently supports means-plus-function claims. Notice objectives require sufficiently detailed structure to inform the public of the specific means that are and are not encompassed in the applicant's invention. Similar concerns apply more broadly, and the Commission urges that courts extend their recent focus on indefiniteness to address functional claiming in general, in order to ensure disclosure of what is within and what is outside of the patent.

B. Improving the Ability to Understand Existing Claims: Claim Construction

Claim construction raises a second, closely related set of issues with profound notice implications. Even with more vigorous application of definiteness principles, claims often will not be undebatably clear on their face. To resolve such issues and assign meaning to a patent's claims, courts have looked to two broad sources of evidence. Intrinsic evidence relies on the claim language, the written description in the specification, and the prosecution history. Extrinsic evidence takes account of external information, such as testimony of expert witnesses and information in external, written texts.

From a notice perspective, intrinsic evidence works best. A third party seeking to understand a claim's meaning can view the intrinsic evidence by reading the patent and consulting the file wrapper (containing the prosecution history). The material is easily identifiable by, and accessible to, third parties. In contrast, litigation and a *Markman* hearing (where expert testimony is taken and external documents are presented for the record) may be required to conclusively identify the most relevant extrinsic evidence. A third party therefore cannot know in advance what external evidence will be utilized.¹⁸¹

The Federal Circuit's 2005 en banc *Phillips* decision,¹⁸² which confirmed the primary role of intrinsic evidence, marks a beneficial step from the perspective of public notice. Identifying the specification as "the single best guide to the meaning of a disputed term,"¹⁸³ the court found it "entirely appropriate" to "rely heavily on the written description for guidance as to the meaning of the claims."¹⁸⁴ Moreover, the court explained, "[P]rosecution history can often inform the meaning of the claim language by demonstrating how the inventor understood the invention and whether the inventor limited the invention in the course of prosecution"¹⁸⁵ Finally, although extrinsic evidence is "less significant than the intrinsic record" for claim construction

¹⁸¹As one panelist put it, "if you start to look at external records, even in biotech, there you can probably find five different people to say five different things." Norviel at 64 (5/5/09). "It's very important," he added, "for it to be all right there [in the prosecution history]." *Id.*

¹⁸²*Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc).

¹⁸³*Id.* at 1315 (internal quotation omitted).

¹⁸⁴*Id.* at 1317.

¹⁸⁵*Id.*

purposes,¹⁸⁶ “unlikely to result in a reliable interpretation of patent claim scope unless considered in the context of the intrinsic evidence,”¹⁸⁷ and poses a risk of “undermining the public notice function of patents,”¹⁸⁸ the Federal Circuit found it “permissible for the district court in its sound discretion to admit the use of such evidence” for appropriate purposes.¹⁸⁹

The hearings explored possibilities for enhancing the value of intrinsic evidence for claim construction purposes. Much of the discussion focused on written description and enablement issues, with the thought that more rigorous enforcement of these doctrines could add to the specification’s value as a claim-construction tool. Other discussion looked at the examination process, seeking ways to raise the likelihood that the prosecution history would answer claim construction questions. Because these intrinsic sources are accessible to third parties, increasing their utility would simultaneously improve public notice.

1. Enhancing the Value of the Specification for Notice Purposes

a. Background and Hearing Record

Two principal legal requirements govern the patent specification for notice purposes. Section 112, first paragraph, provides:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same¹⁹⁰

This requires that the specification (i) describe the invention sufficiently to convey to a person having skill in the art that the patentee/applicant was in possession of the claimed invention at the time the application was filed and (ii) enable third parties to make or use the invention without undue experimentation.¹⁹¹ The first of these formulations is referred to as the written

¹⁸⁶*Id.* (quoting *C.R. Bard, Inc. v. U.S. Surgical Corp.*, 388 F.3d 858, 862 (Fed. Cir. 2004)).

¹⁸⁷*Id.* at 1319.

¹⁸⁸*Id.*

¹⁸⁹*Id.*; *see also id.* at 1317-19.

¹⁹⁰35 U.S.C. § 112. The paragraph concludes with an additional requirement – the specification must “set forth the best mode contemplated by the inventor of carrying out his invention.” While identification of this “best mode” sometimes may help to distinguish the claimed invention from what is not contemplated, the requirement generally is of secondary importance for present purposes.

¹⁹¹*See, e.g., Lizard Tech., Inc. v. Earth Res. Mapping, Inc.*, 424 F.3d 1336 (Fed. Cir. 2005); *Vas-Cath, Inc. v. Mahurkar*, 935 F.2d 1555, 1563-64 (Fed. Cir. 1991).

description requirement; the second, as the enablement requirement. Some have questioned whether the first paragraph of Section 112 actually contains a written-description requirement separate from the enablement requirement. The Federal Circuit, sitting en banc, recently ruled that it does.¹⁹²

Panelists stressed the importance of calibrating claim scope to the specification through enforcement of Section 112 for predictable claim construction and hence, for public notice. Thus, one panelist suggested that seeking “a meaningful fit between the claim’s scope and what actually was described as being the invention, would go a long way towards reconciling what I do think is otherwise just an inherent ambiguity in the English language.”¹⁹³ Another emphasized that orienting claim construction to link the claims with the specification through the enablement and written description requirements gives both better substantive determinations and better notice.¹⁹⁴ Still another advocated strict enforcement of Section 112 as a means for interpreting and cabining claims because the patent applicant, as “the low-cost avoider of ambiguity” should be held responsible for providing the necessary information.¹⁹⁵ And a representative from the biotechnology field offered a blunt, business-based perspective: “[W]ritten description helped us in order to interpret our competitors’ patents”¹⁹⁶

There was considerable testimony, however, that the written description and enablement requirements have been much less stringently enforced in IT industries than in other sectors, leading to claims of ambiguous scope. Several panelists found present application of these doctrines inadequate for notice purposes in IT fields and called for more rigorous enforcement in those industries.¹⁹⁷ One found that “property rights in areas like software are untethered to

¹⁹²See *Ariad Pharms., Inc. v. Eli Lilly & Co.*, 598 F.3d 1336 (Fed. Cir. 2010) (en banc) (holding that, for both original and amended claims, Section 112, first paragraph, states a written description requirement separate from the enablement requirement).

¹⁹³Duric at 77 (5/5/09); see also Lee at 43 (5/5/09) (stressing the importance of “enough support in the specification to describe it in enough detail so that people reading it know what it covers”).

¹⁹⁴See Cotropia at 190-91 (3/19/09); see also Christopher A. Cotropia, *Patent Claim Interpretation and Information Costs*, 9 LEWIS & CLARK L. REV. 57, 83 (2005) (explaining that information in the specification is “tailored to the invention at issue, thereby providing contextual information for use during claim interpretation,” and arguing that reliance on the specification “can help lower the costs associated with understanding the invention defined in the claims”).

¹⁹⁵Kieff at 73 (3/19/09); see also Menell at 65 (5/5/09) (“[W]e want people filing applications to really put as much effort as they can into writing a spec that will provide the answer down the road.”).

¹⁹⁶Shema at 72 (5/4/09); see also Kiani at 49 (3/18/09) (explaining how in doing clearance “[W]e have to do our homework We look at the specification” and stay away from areas that are covered by the specification and not within the prior art).

¹⁹⁷See, e.g., Lutton at 165-66 (5/4/09) (terming “disconnectedness” between written description and scope a “big problem”); Gutierrez at 164-65 (5/4/09); Lee at 114 (5/5/09) (stating that Google is “routinely

possession.”¹⁹⁸ Another observed, “[W]e’ve gotten a long way away from a very kind of rigorous requirement that the claims be really proportionate to or commensurate with what you’ve disclosed.”¹⁹⁹ A third concluded, “[W]e still have a ways to go with respect to written description . . . in terms of the notice function in the IT field.”²⁰⁰ In contrast, there was essentially no indication of need for enhanced Section 112 enforcement in the pharmaceutical and biological arts; indeed, several panelists suggested (or have written) that current enforcement practices are too stringent.²⁰¹

b. Analysis

The written description requirement is an important notice tool. Its focus – describing the actual invention at issue²⁰² – is precisely that needed for enhancing the public’s ability to identify the boundaries of a patent’s claims,²⁰³ which are interpreted in light of that description.²⁰⁴ It tethers the claim to what the applicant possessed and what others need to license or avoid; as claims extend farther beyond the invention expressly described, their boundaries become more

surprised with what we read in the written description and what the patent owner claims the coverage is”); Cotropia at 159-60 (3/19/09); *see also* BURK & LEMLEY, *supra* note 178, at 59 (“The Federal Circuit has essentially excused software inventions from compliance with the enablement and best mode requirements”); Dan. L. Burk and Mark A. Lemley, *Is Patent Law Technology-Specific?*, 17 BERKELEY TECH. L.J. 1155, 1160-66, 1185 (2002) (discussing enablement, best mode, and written description requirements in software cases, and concluding that “little specific detail is needed to satisfy the requirements of disclosure”).

¹⁹⁸Meurer at 211-12 (12/5/08) (adding, “We really need to get serious about disclosure requirements when it comes to software patents . . .”).

¹⁹⁹Merges at 266 (5/4/09).

²⁰⁰Kunin at 153 (3/19/09).

²⁰¹*See, e.g.*, Durie at 116-17 (5/5/09) (suggesting that in the biological arts, there is too much focus on specific examples and insufficient willingness to find support for a broader genus); Cotropia 157-58 (3/19/09); BURK & LEMLEY, *supra* note 178, at 149 (“By requiring disclosure of the particular structure or sequence in order to claim biological macromolecules, the Federal Circuit effectively limits the scope of a patent on those molecules to the structure or sequence disclosed Under this standard, no one is likely to receive a patent broad enough to support the further costs of development.”).

²⁰²*See, e.g., Ariad*, 598 F.3d at 1345 (describing the written description requirement as “a separate requirement to describe one’s invention”).

²⁰³*See id.* (recognizing that a description of the claimed invention in the specification “allows . . . the public to understand and improve upon the invention and to avoid the claimed boundaries of the patentee’s exclusive rights”).

²⁰⁴*Phillips*, 415 F.3d at 1313-17.

ambiguous. Enablement provides less direct information.²⁰⁵ It looks to what others have been enabled to do, not what the applicant/patentee has invented. Moreover, disclosing enough to enable others to make and use the invention after it is known may not disclose enough for others to understand the scope of the invention before it has been clearly delineated.²⁰⁶

While the importance of the written description and enablement doctrines to public notice and the widely held concern that their current application has not provided sufficient notice in IT fields suggest an area for legal development, we note an important trade-off and need for balance: claim construction rules and disclosure doctrines that maximize notice might limit claim scope.²⁰⁷ Confining claim scope to the explicit description of the invention would give clear notice but may not fully protect all that applicants have invented.²⁰⁸ If the enablement doctrine yields appropriate scope, applying written description as a second screen on validity may unduly narrow the patent.²⁰⁹ Yet, if enablement is insufficient to yield clear notice, written description may serve a valuable notice function.

²⁰⁵This is not to denigrate enablement's contribution to notice. Clearly it notifies the public as to how to make and use the claimed invention. *See* Kunin at 151 (3/19/09) (explaining that enablement is “intended to put the public on notice on how to make and use the claimed invention so that when it becomes publicly available, they’ll have the notice of how to practice the invention”). The concern, however, is that that information may not be precisely the type of information needed for effective clearance.

²⁰⁶One of the panelists framed this contrast lucidly. Enablement, he explained, asks, “[F]rom what you gave me, can you get to what you claimed,” whereas written description asks, “What did you actually make and do and describe, and how does that relate to your claims[?]” Kushan at 270 (12/5/08). “That second variable,” he added, “I see as being very powerful in addressing some of the claim scope and transparency issues you see with the software claiming issue.” *Id.* *See also* Duric at 46 (5/5/09) (urging that patent law “focus much more on the written description as a guide to claim construction” because “to the extent that the scope of the claims is truly constrained by the invention that’s described, you have a lot more predictability”); Cotropia at 142 (3/19/09) (explaining how written description has an impact on notice through the claim construction process). *But cf.* Kunin at 151 (3/19/09) (arguing that under “the narrow view of written description,” the doctrine has “basically nothing to do with putting the public on notice”).

²⁰⁷*See* Rai at 145 (3/19/09) (“a lot of the doctrines we have actually in the context of claim construction are intended to perhaps detract a little bit from notice, but give adequate scope”); Cotropia at 124-25 (3/19/09) (finding “a real linkage between substantive rights and notice solutions”).

²⁰⁸*See* Rai at 143-44 (3/19/09) (observing that written description requirements – as some Federal Circuit opinions have interpreted them – play a notice function but end up creating a much narrower patent and urging that we balance notice objectives with adequate patent protection); Cotropia at 157 (3/19/09) (noting the notice and substantive implications of written description requirements); BURK & LEMLEY, *supra* note 178, at 62 (“[A] claim that covers only the thing invented is a weak claim indeed.”).

²⁰⁹*See* Rai at 144 (3/19/09) (noting this “substantive impact [on patent scope] of using written description”).

This report does not attempt to make these trade-offs. Judgments regarding the appropriate scope of patent rights generally would go beyond the range of the Commission's hearings. Rather, the report stresses the notice implications of these choices, so that administrative, judicial, and legislative decision makers will be better able to achieve the appropriate balance. Moreover, it looks for ways to enhance notice without invoking significant trade-offs with scope.²¹⁰ With these considerations in mind, specific suggestions follow.

Level of skill attributable to the PHOSITA. The hypothetical person having ordinary skill in the art – the PHOSITA – is a key element in the enablement,²¹¹ written description,²¹² and indefiniteness²¹³ inquiries. Because what the PHOSITA is able to make, use, find demonstrated, or understand is a reasonable proxy for what third parties are likely to be able to do, the PHOSITA construct serves as a bridge between substantive patentability standards and public notice.²¹⁴

For that bridge to be effective, however, the PHOSITA's abilities must be clearly and accurately defined. This may not always be the case.²¹⁵ Despite the importance of the PHOSITA to proper application of Section 112, the Federal Circuit has provided surprisingly little guidance

²¹⁰See Meurer at 261 (12/5/08) (acknowledging that there are trade-offs between notice and scope in many cases but arguing that there are also “many opportunities to avoid that trade-off completely”).

²¹¹See 35 U.S.C. § 112 (requiring that the specification “enable any person skilled in the art to which [the invention] pertains, or with which it is most nearly connected, to make and use the same”).

²¹²See *Ariad*, 598 F.3d at 1351 (“the [written description] test requires an objective inquiry into the four corners of the specification from the perspective of a person of ordinary skill in the art. . . . [T]he specification must describe an invention understandable to that skilled artisan and show that the inventor actually invented the invention claimed”); *Vas-Cath, Inc., v. Mahurkar*, 935 F.2d 1555, 1563-64 (Fed. Cir. 1991) (explaining that under the written description requirement an applicant must “convey with reasonable clarity to those skilled in the art that, as of the filing date sought, he or she was in possession of the invention”) (emphasis deleted).

²¹³See *supra* notes 138-40 and accompanying text.

²¹⁴See *Kappos* at 243 (3/19/09) (defending doctrine premised on demonstrating that applicant was in possession of the invention as ensuring adequate notice to protect the public “[b]ecause if the standard really is the skilled artisan, right, the person having ordinary skill in the art . . . you inherently wind up with enough disclosure that it winds up not being a problem for third parties to read and understand and be able to make the invention”).

²¹⁵See, e.g., IBM Comment at 3 (2/12/09) (observing that while examiners frequently allow claims containing undefined terms so long as their meaning is discernible to a PHOSITA, “exactly what level of skill constitutes ‘ordinary’ is itself open to interpretation and inconsistently applied, so the discernability requirement is neither clear nor as predictable as it should be”).

regarding applicable skill levels.²¹⁶ Some analysts have argued that, at least for Section 112 purposes, the level of skill attributable to the PHOSITA has been set too high in IT and business-method contexts and too low in biotech settings, respectively understating or overstating the amount of description needed to enable the PHOSITA to practice the invention or to convey to the PHOSITA that the applicant possessed the full breadth of the invention.²¹⁷

Attributing too high a skill level to the IT PHOSITA could unduly reduce disclosure requirements and raise serious notice concerns. Judicial attention and guidance focused on honing the assessment of PHOSITA skill levels relative to the problems posed by the art are needed.²¹⁸ In particular, to ensure adequate notice, the PHOSITA standard must be applied in ways that reflect facts and avoid inappropriate rules of thumb. While full-scale inquiry in every individual case may be unnecessarily burdensome, courts should ensure that application of the PHOSITA standard (i) remains current (that is, up-to-date as of the appropriate reference point

²¹⁶See Burk & Lemley, *supra* note 197, at 1202 (noting that many opinions deal with the PHOSITA “only perfunctorily”). The Federal Circuit repeatedly has listed six factors to consider. See, e.g., *Environmental Designs, Ltd. v. Union Oil Co. of Cal.*, 713 F.2d 693, 696 (Fed. Cir. 1983) (“Factors that may be considered in determining level of ordinary skill in the art include: (1) the educational level of the inventor; (2) type of problems encountered in the art; (3) prior art solutions to those problems; (4) rapidity with which innovations are made; (5) sophistication of the technology; and (6) educational level of active workers in the field.”); *Daiichi Sankyo v. Apotex*, 501 F.3d 1254, 1256 (Fed. Cir. 2007) (same); *Bausch & Lomb, Inc. v. Barnes-Hind/Hydrocurve, Inc.*, 796 F.2d 443, 449-50 (Fed. Cir. 1986) (same). The court, however, has provided little accompanying discussion. See Joseph P. Meara, *Just Who is the Person Having Ordinary Skill in the Art? Patent Law’s Mysterious Personage*, 77 WASH. L. REV. 267, 277-78 (2002) (noting that “the Federal Circuit has had little to say about how to use” the factors it has identified).

²¹⁷See Burk & Lemley, *supra* note 197, at 1191-94 (suggesting that the courts have attributed too high a level of skill to the PHOSITA (while ascribing too low a level of difficulty to the art) in software and too low a level of skill in biotech); BURK & LEMLEY, *supra* note 178, at 149, 163 (urging, for Section 112 purposes, attributing a lower level of skill to the PHOSITA in semiconductors and a higher level of skill in biotechnology); Marian Underweiser, *Time to Reconsider the PHOSITA*, in 184 MANAGING INTELLECTUAL PROPERTY 28 (Nov. 2008) (discussing the PHOSITA’s skill level in software, business methods, and biotechnology); cf. Cotropia at 245 (3/19/09) (citing the need for examining Section 112 issues on a case-by-case basis rather than merely assuming that issues in electrical industries are predictable and issues in biotech industries are unpredictable). For a summary of previous testimony focused on this topic see 2003 FTC IP Report, ch. 4, at 24-26.

²¹⁸The PHOSITA’s skill level and the difficulty of the relevant art in many respects are flip sides of the same inquiry. For example, the ability to write software programs could be overstated either by ascribing too much skill to the PHOSITA or too little difficulty to the task.

for assessment) as technologies evolve²¹⁹ and (ii) accurately reflects the facts pertinent to the particular technology at hand, which may differ among technologies within an industry.²²⁰

Enablement and product life cycles. Application of the PHOSITA construct to the enablement inquiry compels attention to timing. Section 112 has been understood to require a disclosure that enables a PHOSITA to make and use the invention without “undue experimentation.”²²¹ From the perspective of competitive impact, time-consuming experimentation is more likely to be undue in a setting where product life-cycles are measured in months than in a context where they are measured by decades.²²² However, the factors traditionally considered in evaluating the “undue experimentation” issue omit this commercial perspective on timing.²²³ Recognition of this timing element would tend to increase the amount or detail of written description needed for enablement purposes in an industry such as software, where product life cycles are notoriously short.²²⁴

Designated/default dictionaries. Other changes could sharpen both the specification and claims as notice devices. One step would be a PTO requirement that applicants either designate a

²¹⁹The Federal Circuit in principle has recognized the need for updating the companion inquiry into the predictability of relevant technologies, *see Enzo Biochem, Inc. v. Calgene, Inc.*, 188 F.3d 1362, 1375 n.10 (Fed. Cir. 1999) (“[i]n view of the rapid advances in science . . . what may be unpredictable at one point in time may become predictable at a later time”). But it has been criticized for failing to apply similar thinking when assessing the PHOSITA’s skill level relative to the problems posed by the art. *See BURK & LEMLEY, supra* note 178, at 116 (arguing that in applying the PHOSITA standard, courts are “substituting constructs for detailed analysis” and “failing to update those constructs as knowledge in the industry changes”).

²²⁰*See R. Polk Wagner, Of Patents and Path Dependency: A Comment on Burk & Lemley*, 18 BERKELEY TECH. L. J. 1341, 1347 (2003) (urging that the PHOSITA’s level of skill be examined through a fact-specific, innovation-by-innovation lens grounded in “the technological facts in any given case”).

²²¹*See In re Wands*, 858 F.2d 731, 737 (Fed. Cir. 1988).

²²²*See Underweiser, supra* note 217 (arguing that when product life cycles are brief “a sparse disclosure does not have the teaching needed to reflect the rapid pace of advancement in the field”). A lag from lengthy experimentation may not often affect use of the patented invention itself – the patent life may well be much longer. A need for lengthy experimentation, however, may delay use of the disclosed information for unprotected purposes, and if that delay renders the information stale, it may undermine the public benefit of the disclosure.

²²³*See Wands*, 858 F.2d at 737 (listing as factors “(1) the quantity of experimentation necessary, (2) the amount of direction or guidance presented, (3) the presence or absence of working examples, (4) the nature of the invention, (5) the state of the prior art, (6) the relative skill of those in the art, (7) the predictability or unpredictability of the art, and (8) the breadth of the claims”).

²²⁴*See Underweiser, supra* note 217 (“Where development is accelerated relative to other technical fields, as is frequently the case in software, it is not appropriate to omit detailed information which is needed to teach the PHOSITA how to practise the invention in a practical time frame.”).

dictionary or accept the use of a PTO-designated default dictionary²²⁵ for assigning meaning to terms not defined in the patent application.²²⁶ Identifying a particular dictionary would avoid disputes over which dictionary applies, providing significant “clarity up front.”²²⁷ And it would do so in a way that third parties could apply to reach the same results. In essence, the fact that the designation would appear in the patent application would convert the dictionary definition into intrinsic evidence.²²⁸

Definitions or contextual references. One concern raised repeatedly during the hearings was that claims frequently use terms with no apparent definition or explanation in the specification.²²⁹ Clarity would be added, and notice improved, if applicants were pressed to include definitions or contextual explanations of key terms.²³⁰ One possibility would be requiring a glossary defining any key terms that are not covered by a designated or default dictionary or that the applicant chooses to define differently than in such a dictionary.²³¹

²²⁵The PTO-designated default dictionary could vary by art unit.

²²⁶The continued ability to define terms in the application would preserve the applicant’s traditional entitlement to act as his or her own lexicographer, as reflected, *e.g.*, in MPEP § 2173.01. Moreover, the identification of a dictionary is not intended to change relative reliance on dictionaries as opposed to intrinsic evidence, *see Phillips*, 415 F.3d at 1313-24, but rather to specify which dictionary is to be used when dictionaries are consulted.

²²⁷Kappos at 193-94 (3/19/09); *see also* Wagner at 200-01 (4/17/09) (explaining that designating a default dictionary would force patentees “to either accept the default meaning or say something that would indicate to the public that they’re not using the default meaning”); IBM Comment at 5, 8 (2/12/09); *cf.* BESSEN & MEURER, *supra* note 16, at 239-40 (suggesting that when applicants have not provided their own definitions, “The Patent Office, or the various art units within the Patent Office, could establish glossaries of commonly used claim terms, or specify certain references as authoritative sources of definitions.”). Others noted complexities that might have to be resolved. *See* Kunin at 194 (3/19/09) (noting the problem of foreign-language applications); Armitage at 196 (3/19/09) (noting that dictionary definitions sometimes change from year to year).

²²⁸*See* Rai at 195-96 (3/19/09).

²²⁹*See* Van Pelt at 154-55 (5/4/09) (discussing “ink blot claims,” where words are used only in the claim); Krall at 114 (3/18/09); IBM Comment at 2-3 (2/12/09); *cf.* Kappos at 148 (3/19/09) (flagging the problem of claim terms added during prosecution that do not appear in the written description); Norviel at 63 (5/5/09) (contrasting IT patents, where there are no definition sections “in most or any of them,” with biotech patents, where definition sections are “almost routine”).

²³⁰Indeed, the PTO’s just-issued Supplementary Examination Guidelines take a substantial step in this direction. *See* 76 Fed. Reg. at 7,166 (stating, “[A]pplicants are encouraged to use glossaries as a best practice in patent application preparation.”).

²³¹*See* Rivette at 54 (5/5/09) (suggesting that a definitional page be required in applications); Wagner at 199 (4/17/09); IBM Comment at 5 (2/12/09) (urging that an applicant who wants to apply a specific meaning should be required to provide a glossary defining the relevant term); *cf.* Vermont at 202

Inclusion of such a glossary in a patent application (i) would facilitate the public's understanding of a patent by placing any internal definitions in a central, readily located place and (ii) could force the applicant to think about and articulate the meaning that he or she intends for key patent terms.²³² Another possibility would be a requirement that key claim terms appear in the specification "in order to provide context and meaning," coupled with a ready means for identifying where in the specification the terms appear.²³³

Nomenclature or methods of description. A further step would be for the PTO to convene a government/industry task force or hold a workshop to explore ways of moving toward a common nomenclature or otherwise improving the description of software inventions. The hearings received substantial testimony that varying usages and nomenclature were impediments to effective notice in areas like software.²³⁴ In contrast, other testimony praised PTO's Sequence Listing Rules for certain biotech disclosures for bringing uniformity to descriptions of the structural aspect of inventions.²³⁵ Although opportunities for uniformity comparable to rules specifying the order and grouping of nucleotide and amino acids are unlikely to be common, helpful steps toward uniformity might still be identified with a concentrated effort and substantial industry assistance.²³⁶ Consequently, the PTO may wish to consider holding a workshop or designating a task force to discuss with software industry representatives whether guidelines might be devised to achieve greater uniformity of methodology or language used for describing and claiming inventions, with the objective of enhancing public understanding of software patents.

Recommendations: enhancing the specification. (1) The Commission urges the courts to direct heightened attention and provide additional guidance regarding the assessment of PHOSITA skill levels relative to the problems posed by the art. To serve notice goals application of the PHOSITA standard should be fact-based, up-to-date, and appropriately tailored to the

(4/17/09) (urging that an applicant who adopts "an idiosyncratic meaning" be required "to say so explicitly [in the] specification"); Lee at 57 (5/5/09) (stating that a definitional page "in some sense would help tremendously").

²³² Cf. Lee at 58 (5/5/09) (asking whether requiring a glossary would make examiners and applicants "really define the terms . . . being used" and supporting the requirement "if the answer is yes").

²³³ See IBM Comment at 3-4 (2/12/09); Lee at 90 (5/5/09); Schultz at 88 (5/5/09) (suggesting that charts linking claims to the specification would be low-cost means of enhancing notice).

²³⁴ See *supra* notes 69-71 and accompanying text.

²³⁵ See Shema at 70-71 (5/4/09) (referring to rules at 37 C.F.R. §§ 1.821-1.825).

²³⁶ Testimony indicated that considerable effort had been made by the biotechnology community to develop common nomenclature. See Shema at 70-71 (5/4/09). The Sequence Listing Rules also were able to incorporate by reference a pre-existing World Intellectual Property Organization standard that established codes for nucleotide sequence bases and amino acids and nomenclature for nucleotide sequence features. See MPEP § 2422.

specific technology at hand. (2) Determinations regarding whether a disclosure requires undue experimentation should give recognition to the competitive significance of the time required for experimentation; when product life-cycles are short, greater disclosures may be needed in order to be competitively meaningful. (3) The Commission recommends that patent applicants be required either (i) to designate a dictionary for use in assigning meaning to terms not defined in the application or (ii) to acknowledge acceptance of a PTO-designated default dictionary for that purpose. The PTO-designated default dictionary could vary by art unit. (4) The Commission urges the PTO to continue to look for ways to press patent applicants to include definitions or contextual explanations of key terms. Mechanisms that could accomplish this include (i) requiring applicants to provide a glossary defining any key terms that are not covered by a designated or default dictionary or that the applicant chooses to define differently than in such a dictionary or (ii) requiring that applicants include key claim terms in the specification and provide a ready means for identifying where they appear. (5) The Commission urges that the PTO convene a government/industry task force or hold a workshop to explore ways of fostering greater uniformity in the methodology or language used for describing and claiming software inventions.

2. Enhancing the Prosecution History for Notice Purposes

In addition to the language of the patent itself, intrinsic evidence relevant to a claim's meaning may appear in the prosecution history. Information exchanged between applicants and examiners is potentially a fertile source of information regarding the intended scope of the claims.²³⁷ A simple statement on the record may cut through considerable ambiguity.

Panelists testified to the potential power of the prosecution history. One panelist explained how “you can look at the file history” and “figure out where things are,” even if the claim itself is ambiguous.²³⁸ Another described the file history as “an opportunity to help define, essentially through what was said during the course of the prosecution.”²³⁹ A third panelist has written that a core “measure of [PTO] success should be how effectively the Office creates a record that permits the Office as well as ex post actors to better understand the boundaries of patented property.”²⁴⁰

²³⁷See, e.g., *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 979 (Fed. Cir. 1995) (en banc) (stating that “[t]o ascertain the meaning of claims, we consider three sources: The claims, the specification, and the prosecution history,” while noting that extrinsic evidence may also be used) (internal quotation omitted), *aff’d*, 517 U.S. 370 (1996).

²³⁸Norviel at 64 (5/5/09).

²³⁹Kunin at 138 (3/19/09) (highlighting the possibility of disclaimers of claim scope).

²⁴⁰Lee Petherbridge, *Positive Examination*, 46 IDEA 173, 219 (2006).

Several steps could be taken. The panelists registered considerable support for increasing and recording examiner/applicant exchanges pertinent to patent scope.²⁴¹ Exchanges discussing what a claim means, why a term is or is not clear, or how a claim might be amended to remove ambiguity are all especially useful.²⁴² New wording introduced by claim amendments may prove particularly fertile ground for such examiner/applicant discussions. The examiner may proceed formally – through indefiniteness rejections that pinpoint the source of uncertainty in ways that invite clarification from the applicant²⁴³ – or informally, through interviews.²⁴⁴ Meaningful recording of the exchanges regarding patent scope is essential: as one panelist emphasized, “[P]utting it down on paper produces an information product that then feeds into claim interpretation later down the road.”²⁴⁵

Fully developing this approach, however, may require a continued shift in focus within the PTO, particularly at the examiner level. Many of the PTO’s core validity inquiries – such as determining the obviousness of an invention – can be pursued using an ambiguous claim’s broadest reasonable interpretation.²⁴⁶ Consequently, examiners may need to be reminded of the patent system’s notice function and encouraged to build a record that improves claim scope

²⁴¹*See, e.g.*, Armitage at 121-22 (3/19/09) (projecting “enormous downstream benefit in analyzing . . . valid claims” from having patentees explain why their invention is patentable); Kappos at 162-63, 174 (3/19/09) (suggesting that examiners request removal of parts of claims that are not intended to be limitations, thereby encouraging applicants to respond on the record); Cotropia at 178 (3/19/09) (suggesting that examiners should be “forcing the applicant to engage in [a] discussion” of claim interpretation questions and explaining that this would “basically [be] making explicit what is implicitly happening”); Lee at 89 (5/5/09) (stating that “anything in terms of a conversation between the applicant and the examiner that gets to the issue of what is old and what is new” is “critical” and “getting that on the record is even more critical”); McNelis at 92 (5/5/09) (if an examiner “forced the issue,” useful information could be obtained regarding the purposes of amendments). *But cf.* Messinger at 222-23 (3/19/09) (expressing doubt that statements of purpose of claim amendments in the absence of an accused product would be useful).

²⁴²*See generally* Petherbridge, *supra* note 240, at 173 (explaining that engaging the patent applicant – “the party best positioned to most cheaply provide” information about the patent’s intended boundaries – in ways that building a prosecution history record enables all participants in the patent system “to form a more certain understanding of the boundaries of the property at issue and more usefully compare it to prior art and commercial goods and services”).

²⁴³*See* Kunin at 215-16 (3/19/09); Cotropia at 217 (3/19/09).

²⁴⁴*See, e.g.*, Schultz at 71 (5/5/09); Menell at 91 (5/5/09).

²⁴⁵Cotropia at 179 (3/19/09); *see* MPEP § 713.04 (requiring records of interviews).

²⁴⁶*Compare id.* (warning that “we don’t want to sidestep interpretation during examination”) with MPEP § 2111 (“During patent examination, the pending claims must be given their broadest reasonable interpretation consistent with the specification.”) (internal quotation omitted).

clarity.²⁴⁷ With its just-issued Supplementary Examination Guidelines, the PTO has provided just such a reminder;²⁴⁸ if vigorously implemented in examination practices, this could substantially elevate attention to notice objectives.

The Commission's 2003 IP Report recommended "a concentrated effort to use examiner inquiries [under PTO Rule 105] more often and more extensively."²⁴⁹ We here reiterate that recommendation as a means for enhancing the prosecution history regarding claim scope. Such inquiries can be used to gather a broad range of information regarding the meaning of claims.²⁵⁰ For example, a topic that drew attention at the hearings was the recurring issue of whether embodiments in the specification are meant to be "illustrative or limitative."²⁵¹ Examiner inquiries and applicants' responses on that and other topics could improve the public's ability to understand the meaning and scope of many patent claims.

²⁴⁷See, e.g., Cotropia at 217 (3/19/09). Of course, increased emphasis during prosecution on the Section 112 patentability standards, including indefiniteness and the written description requirement, as urged above, likely will carry with it an enhancement of prosecution history, as applicants are forced to add clarity in order to avoid rejection of claims. See Kappos at 163 (3/19/09).

²⁴⁸See, e.g., 76 Fed. Reg. at 7,169 (flagging the fashioning of clear and unambiguous claims as "[a]n essential purpose of patent examination") (internal quotation omitted). Indeed, the new guidelines encourage examiners to make greater use of rejections and interviews to pinpoint and record indefiniteness concerns, as discussed above, as well as to provide, in appropriate cases, reasons for allowance and for withdrawing rejections, as discussed below. *Id.* at 7,169-70.

²⁴⁹FTC 2003 IP Report, ch. 5, at 13-14. Rule 105 permits examiners to request "such information as may be reasonably necessary to properly examine or treat the matter" 37 C.F.R. § 1.105.

²⁵⁰See 37 C.F.R. § 1.105(a)(1)(viii) (including among examples of information that might be sought under Rule 105, "Technical information known to the applicant concerning . . . the disclosure, the claimed subject matter . . . or concerning the accuracy of the examiner's stated interpretation of such items."); Kappos at 162-63 (3/19/09) (stating that Rule 105, though "very much unused," is a "great way . . . to reach out to applicants" and urging that examiners "use inquiry techniques . . . without necessarily interposing an objection or rejection" to build "better file histories" on topics such as the location of term definitions, whether means-plus-function claiming was intended, and the location in the specification of structure corresponding to a claim).

²⁵¹Menell at 91 (5/5/09) (explaining that this "tends to be the critical issue when you get to claim construction"); *id.* at 66 (5/5/09) (identifying uncertainty regarding this issue as a frequent problem in IT and explaining that applicants sometimes "play . . . game[s]" by trying "to have it both ways"); *cf.* Rai at 191 (3/19/09) (agreeing that determining whether a claim is limited to specific embodiments is a recurring issue requiring further thought); Burk at 11-12 (5/5/09) (identifying issues raised by multiple embodiments, some of which may not even have been thought of when the claims were drafted, as posing inherent notice problems). See generally Schultz at 71-72 (5/5/09) (asserting that "people change their story when they get into litigation" and describing the value of achieving greater consistency by inducing the applicant to commit to certain positions).

A further step would be to encourage examiners to make greater, and more informative, use of statements of reasons for allowance. Under current practice, “If the examiner believes that the record of the prosecution as a whole does not make clear his or her reasons for allowing a claim or claims, the examiner may set forth such reasoning.”²⁵² Several hearing participants indicated that expanded use of reasons for allowance that go beyond pro forma recitations and “actually delineate[] what the basis for allowance was”²⁵³ would contribute to better public notice.²⁵⁴ The PTO has highlighted the need for care in formulating these statements,²⁵⁵ but judicious application of this procedure when needed to make clear the claim interpretation applied by the examiner could yield substantial benefit from a notice perspective. Similarly, examiners could contribute to better notice by providing specific statements of reasons for withdrawing indefiniteness rejections.

To make these last measures effective, examiners’ statements must receive due weight as interpretive guides to the meaning of claims. Examiner views, however, have not always received much traction in court.²⁵⁶ Panelists urged that greater weight be accorded examiner views, one arguing that “what the examiner thought and the reason that the examiner allowed the claims” should be “the touchstone of what we care about.”²⁵⁷ Such statements are properly

²⁵²37 C.F.R. § 1.104(e).

²⁵³Durie at 100-01 (5/5/09).

²⁵⁴See Rea at 141 (3/19/09); Kappos at 224-25 (3/19/09); Lee at 89-90 (5/5/09); Schultz at 95-96 (5/5/09); Rivette at 103 (5/5/09).

²⁵⁵See *MPEP* § 1302.14 (cautioning that “care must be taken to ensure that statements of reasons for allowance . . . are accurate, precise, and do not place unwarranted interpretations, whether broad or narrow, upon the claims” and that an examiner “should keep in mind the possible misinterpretations of his or her statement that may be made and its possible effects”); see also Petherbridge at 97 (5/5/09) (warning that reasons for allowance currently are “not well thought out” and explaining the need for quality control if the practice is expanded). The applicant’s right to respond to the examiner would likely be a significant safeguard. See 37 C.F.R. § 1.104(e).

²⁵⁶See Durie at 101 (5/5/09) (noting that many courts “view the prosecution history through the lens of [applicant] disclaimer” and consequently “consider statements by the examiner to be much less relevant”); cf. *Salazar v. Procter & Gamble Co.*, 414 F.3d 1342, 1345, 1347 (Fed. Cir. 2005) (refusing to apply prosecution history estoppel based on “the unilateral statements of an examiner in stating reasons for allowance,” while recognizing that an examiner’s statements about a claim term “may be evidence of how one of skill in the art understood the term at the time the application was filed”).

²⁵⁷Durie at 101 (5/5/09) (observing that the examiner’s rulings are a foundation of the presumption of validity accorded the issued patent); see also Menell at 103 (5/5/09) (urging that courts give “some degree of consideration” to examiners’ commentary, although “maybe not deference in a *Chevron* sense”); Lutton at 163 (5/4/09) (arguing that “doing more examination on the record and documenting the assumptions of where there is support for the claim elements” would enable courts to determine what the PTO thought was the support for the claim and “tether” the application “back to the assumptions that

considered part of the prosecution history,²⁵⁸ and, particularly in light of the applicant's right to respond when in disagreement, should be more broadly recognized as a source of interpretive information.

Recommendations: enhancing the prosecution history. (1) The Commission urges that examiners be further encouraged to build a record that improves claim scope clarity. In part, this may be achieved through greater focus on Section 112 standards, including the prohibition of indefiniteness and the requirement for written description. Additional notice may be derived via indefiniteness rejections or interviews tailored to elicit information from applicants regarding the meaning of their claims. Beyond this, the Commission reiterates the recommendation in its 2003 IP Report for "a concentrated effort to use examiner inquiries [under PTO Rule 105] more often and more extensively," as a means, for present purposes, of increasing and recording examiner/applicant exchanges pertinent to patent scope. (2) The Commission recommends that the PTO continue to encourage examiners to make greater, and more informative, use of statements of reasons for allowance and for withdrawing indefiniteness rejections and that the courts accord such statements due weight as prosecution history relevant to interpreting the meaning of claims.

C. Improving the Ability to Foresee Evolving Claims

To this point the discussion has focused on improving the ability to understand existing claims. A different notice issue involves the ability to foresee evolving claims. Claims may be amended during the prosecution process. Existing claims may be broadened and new claims may be added. As long as the original specification adequately supports the amended or new claims under Section 112, the patentee retains the advantage of the original application filing date.²⁵⁹ In essence, the original specification and the requirements of Section 112 set the limits on claim evolution. The ability of third parties to foresee evolving claims is shaped by whether and when the specification is published and by the extent to which the specification provides effective notice of the range of claims that ultimately might issue.

As discussed in Section III.B above, numerous panelists, particularly in the IT industries, voiced concern that they were unable to adequately predict what claims might emerge from an initial application. They worried about exposure to unpublished applications and to unanticipated claim amendments. They stressed that third parties must make research, design, and production decisions while waiting for patent applications to be published and for claims to take their final, issued form, and face exposure if their products ultimately infringe a previously unpublished or amended patent application. Section II explained some of the competitive

gave rise to its grant").

²⁵⁸See Rai at 223 (3/19/09) (predicting that courts would look at examiner statements about the meaning of claim terms as prosecution history, rather than as findings entitled to deference).

²⁵⁹35 U.S.C. §§ 120, 132.

problems that this may pose. This section explores possibilities for limiting or avoiding those problems by increasing the foreseeability of evolving claims.

A predicate for this discussion is an ongoing examination process. Unfortunately, the PTO currently suffers under a huge application backlog, which delays even the onset of examination. At the end of fiscal year 2010, the PTO had a backlog of more than 726,000 applications awaiting action by examiners.²⁶⁰ On average, 25.7 months passed between filing and the first office action, and total pendency averaged 35.3 months.²⁶¹ To the extent that notice problems are otherwise present, delay in commencing the examination procedures that begin to add clarity only adds to the period of uncertainty.²⁶² Updating a recommendation in the 2003 FTC IP Report,²⁶³ we urge that the PTO receive the funding and information systems needed to promptly and properly examine the flood of applications that it faces.²⁶⁴

1. Publication of Applications

Publication of patent applications is a prerequisite for foreseeing evolving claims. Until the application is available to public view, third parties have no opportunity to determine whether they have freedom to operate in an area. Under current laws, most U.S. patent applications must be published 18 months after filing.²⁶⁵ If an application is filed only domestically, however, the applicant may “opt out” of the publication requirements, keeping the application secret until the patent issues.²⁶⁶

²⁶⁰2010 PTO Annual Report, *supra* note 91, at 18. The PTO received approximately 509,000 patent applications in fiscal year 2010, including 479,000 for utility patents. *Id.* at 126, tbl. 2.

²⁶¹*Id.* at 18.

²⁶²See Arti Rai, Stuart Graham, & Mark Doms, *Patent Reform: Unleashing Innovation, Promoting Economic Growth & Producing High-Paying Jobs – A White Paper from the U.S. Department of Commerce* at 5 (Apr. 13, 2010) (describing the impact on R&D efforts of patent applicants’ competitors posed by uncertainty associated with patent delay).

²⁶³FTC 2003 IP Report, ch. 6, at 18-19 (calling on Congress to allocate “sufficient funds to allow the PTO to ensure quality patent review”).

²⁶⁴The PTO has affirmed that reducing pendency periods and providing timely examination of patent applications are among its highest priorities. USPTO, FY 2010-2015 Strategic Plan, 6-7 (2010), available at http://www.uspto.gov/about/stratplan/USPTO_2010-15_Strategic_Plan.pdf (“PTO Strategic Plan”).

²⁶⁵35 U.S.C. § 122(b)(1)(A). See *Issues Relating to the Patenting of Tax Advice: Hearing Before the Subcomm. on Select Revenue Measures of the H. Comm. on Ways & Means*, 109th Cong. (2006) (statement of James A. Toupin) (estimating that approximately 90% of applications are published).

²⁶⁶See 35 U.S.C. § 122(b)(2)(B).

Noting the “benefits of publication to business certainty and the potential competitive harms and hold-up opportunities that flow from unanticipated ‘submarine’ patents,” the 2003 FTC IP Report recommended legislation “requiring publication of patent applications 18 months after filing, whether or not the applicant also has sought patent protection abroad.”²⁶⁷ Prompt publication won almost universal praise at the 2008-09 hearings, with testimony describing unpublished applications as “a real threat to expensive R&D.”²⁶⁸ Several panelists urged that the publication requirement be extended to all applications.²⁶⁹ We agree and consequently reiterate our 2003 recommendation.²⁷⁰

A few panelists would go farther. They urged that, particularly in short-cycle industries, notice might be improved with publication immediately upon filing.²⁷¹ The record on this was

²⁶⁷2003 FTC IP Report, ch. 5, at 15. Prestigious study groups over several decades have made similar recommendations. *See, e.g.*, NAT’L RESEARCH COUNCIL OF THE NAT’L ACADS., A PATENT SYSTEM FOR THE 21ST CENTURY 128 (Stephen A. Merrill, Richard C. Levin & Mark B. Myers eds., 2004) (“NAS REPORT”) (recommending publication of all applications after 18 months); REPORT OF THE PRESIDENT’S COMMISSION ON THE PATENT SYSTEM at 16 (1966), *reprinted in* TO PROMOTE THE PROGRESS OF THE USEFUL ARTS, SUBCOMM. ON PATENTS, TRADEMARKS AND COPYRIGHTS OF THE SENATE COMM. ON THE JUDICIARY, 90TH CONG., 1ST SESS. (1967) (“Early publication could prevent needless duplication of the disclosed work, promote additional technological advances based on the information disclosed, and apprise entrepreneurs of their potential liability.”).

²⁶⁸Phillips at 201-02 (3/18/09) (terming 18-month publication “truly critical”); *see also* Harris at 123 (3/18/09) (describing unpublished applications as undermining effective search); Brian Kahin, *The Patent Ecosystem in IT: Business Practice and Arbitrage*, slide 8, presented at FTC Hearing: The Evolving IP Marketplace (Dec. 5, 2008), *available at* <http://www.ftc.gov/bc/workshops/ipmarketplace/dec5/docs/bkahin.pdf> (identifying “secrecy about contemplated and filed applications before publication” as a “source[] of information failure/opacity”).

²⁶⁹*See* Schwartz at 10-11 (3/19/09); Rea at 256-57 (3/19/09); Kunin at 257-58 (3/19/09); Cotropia at 258 (3/19/09); Rivette at 112 (5/5/09); AIPLA Comment at 8 (5/15/09) (“AIPLA endorses efforts that would require the PTO to publish all pending patent applications at 18 months after initial filing”).

²⁷⁰As in 2003, the one possible qualification might be a mechanism for according “any necessary protection to independent inventors.” 2003 FTC Report, ch. 5, at 15. *See* McNelis at 113 (5/5/09) (urging that all applications should be published at 18 months, apart from “potentially . . . a carveout” for “solo inventors,” who fear that publication would allow infringers to “steal” their inventions because they would find it too expensive to sue); *cf.* Katznelson at 34-35 (3/18/09) (expressing concern that disclosing claims allows others to copy them and invoke interference procedures). Moreover, our recommendation is confined to applications exempt from publication because of the absence of filing and required publication abroad; it is not meant to disturb other exceptions to the publication requirement (such as the exception for applications subject to a secrecy order), referenced *supra* at note 95.

²⁷¹*See* Menell at 34-35 (5/5/09); Lee at 110-11 (5/5/09) (noting that software products may move from concept to launch in three months, so that an 18-month delay can render clearance searches “out of date”); Martin Comment at 13 (5/15/09); *cf.* Horton at 196 (3/18/09) (stressing the importance of prompt publication when business cycles are compressed).

quite thin, however, and the full implications have not been explored.²⁷² The idea warrants additional study but is not the subject of a recommendation.

2. Written Description and the Problem of Expanding Claims

a. Background and Hearing Record

The disclosure requirements in Section 112, first paragraph – enablement and written description – provide important protections against undue broadening of a patent application’s scope through claim additions or amendments. If the original disclosure does not provide adequate support, the added or broadened claims are invalid.²⁷³ Moreover, when an applicant extends the prosecution process through a series of related applications, new or broadened claims in a subsequent application must be supported by the original application’s disclosure if they are to receive priority based on the parent application.²⁷⁴ Panelists described the written description requirement in particular as “the bulwark” against claims that “evolve and morph” inappropriately,²⁷⁵ a context where that doctrine has been long, and widely, applied.²⁷⁶

Reviews are mixed as to how well these protections actually work in practice, with particular concerns expressed in IT contexts.²⁷⁷ Hearing testimony suggested that one problem is that the law of written description is not particularly well-developed. “[U]ntil there is a coherent set of factors for making [the written description] determination,” one panelist explained, “it is

²⁷²See Norviel at 48 (5/5/09) (stating that he is not opposed to immediate publication but expressing the need to protect “small inventors”); Lee at 110-11 (5/5/09) (noting possibilities for gamesmanship with immediate publication); Rearden, LLC Comment at 6 (2/5/09) (arguing that immediate publication could leave inventors unprotected).

²⁷³See, e.g., *PIN/NIP, Inc. v. Platte Chem. Co.*, 304 F.3d 1235, 1247-48 (Fed. Cir. 2002) (invalidating an added claim that lacked support in the application as originally filed).

²⁷⁴*Liebel-Flarsheim Co. v. Medrad, Inc.*, 358 F.3d 898, 909 n.2 (Fed. Cir. 2004); *Reiffen v. Microsoft Corp.*, 214 F.3d 1342, 1346 (Fed. Cir. 2000). See *infra* Section IV.C.3 (discussing continuation practice).

²⁷⁵See Van Pelt at 159 (5/4/09); see also Rai at 237-38 (3/19/09) (arguing that the claim-amendment context – rather than that of originally-filed claims – was where the written description requirement “was supposed to really play a role”).

²⁷⁶See *Vas-Cath*, 935 F.2d at 1560; MERGES & DUFFY, *supra* note 175, at 262.

²⁷⁷See *supra* Section III.B; Kappos at 243 (3/19/09) (suggesting that the written description requirement isn’t “being policed well enough” and that “112 enablement in the IT area is, most certainly, not being tightly examined”); cf. Rai at 238 (3/19/09) (suggesting that written description may be inadequately enforced with regard to later-filed claims and too strictly enforced with regard to original claims).

going to be difficult to have the public have adequate notice on the written description requirement.”²⁷⁸

The potential competitive consequences of any breakdown of notice of evolving claims are highlighted by a Federal Circuit doctrine. In its 1988 *Kingsdown* decision,²⁷⁹ the court overturned a holding of inequitable conduct based in part on an amendment of claims to cover a competitor’s product. The Federal Circuit declared that it is not

in any manner improper to amend or insert claims intended to cover a competitor’s product the applicant’s attorney has learned about during the prosecution of a patent application. Any such amendment or insertion must comply with all statutes and regulations, of course, but, if it does, its genesis in the marketplace is simply irrelevant and cannot of itself evidence deceitful intent.²⁸⁰

Kingsdown’s progeny make it clear that priority or validity of such amendments depends on support in the specification of the originally filed application.²⁸¹

b Analysis

The traditional answer to these concerns is that so long as a patent application’s specification presents sufficient information to convey to a PHOSITA that the applicant was in possession of the claimed invention at the time the application was filed and to enable the PHOSITA to make and use that invention, the public receives adequate notice of potential evolving claims.²⁸² Certainly, those requirements provide some notice. But, they do not focus on precisely the right question. There is potentially a subtle, but extremely important, distinction between possession and predictability. Possession uses the claim to define an inquiry about the past – what the inventor had achieved at the time of the application. Predictability relies on the

²⁷⁸Kunin at 239, 241-42 (3/19/09) (explaining that the lack of a coherent body of case law on written description impairs the utility of the doctrine for informing the public about the potential for evolving claims).

²⁷⁹*Kingsdown Med. Consultants, Ltd. v. Hollister, Inc.*, 863 F.2d 867 (Fed. Cir. 1988).

²⁸⁰*Id.* at 874.

²⁸¹*See Liebel-Flarsheim*, 358 F.3d at 909 n.2 (finding no impropriety in amending claims to encompass a competitor’s product “as long as the disclosure supports the broadened claims”); *PIN/NIP*, 304 F.3d at 1247 (“there must be support for such amendments or additions in the originally filed application”).

²⁸²*See Kappos* at 242-43 (3/19/09) (finding no “necessary tension between the doctrine that is keyed to the applicant demonstrating that she or he was in possession of the invention, and that requirement then being what we depend on to protect the public,” so long as the requirement is adequately policed). “[I]f the standard really is the [PHOSITA,] you inherently wind up with enough disclosure that it winds up not being a problem for third parties to read and understand and be able to make the invention.” *Id.* at 243.

specification to project the future – what the applicant could later think to claim through amendments. Similarly, traditional enablement inquiries ask whether the disclosure enables a PHOSITA to make and use a given, claimed invention, not whether it enables the PHOSITA to predict what might be claimed in the future. Demonstrating possession and enablement, as those disclosure obligations are currently understood, may not ensure predictability.

Indeed, the traditional formulation for the inquiry – “most often phrased as whether the application provides ‘adequate support’ for the claim(s) at issue”²⁸³ – highlights the distinction. The test is directional in nature. *Starting from the claims*, it works back to ask whether the PHOSITA would understand from the specification that the applicant was in possession of the claimed invention at the time of filing or whether the PHOSITA could make and use the claimed invention based on the information disclosed. But a true predictability inquiry would move in the opposite direction – *starting with the specification*, it would look forward to ask whether a PHOSITA would predict that these claims would emerge.²⁸⁴ To the extent that current application of disclosure doctrines does not adequately ensure a third party’s ability to foresee the claims that may evolve,²⁸⁵ the public is exposed to unnecessary risk of unexpected infringement.

Current doctrine does not acknowledge this gap in notice – it assumes that when Section 112 disclosure requirements are met, there is no problem with broadening claims to cover the fruits of a rival’s subsequent R&D. But unless the rival – endowed with the skill of the PHOSITA – could have predicted at the time of investing in R&D that the outcome would be a product that the patentee would later claim and demonstrate, after-the-fact, to be supported by the specification – the broadened claims reach beyond the application’s effective notice. When that

²⁸³ *Vas-Cath*, 935 F.2d at 1560.

²⁸⁴ This point recalls the courts’ frequent caution against declaring inventions obvious on the basis of hindsight. *See, e.g.*, *KSR Int’l Co. v. Teleflex, Inc.*, 550 U.S. 398, 421 (2007); *Graham v. John Deere Co.*, 383 U.S. 1, 36 (1966). A hindsight-dominated evaluation of public notice of evolving claims is infected with similar infirmities as a hindsight-driven assessment of obviousness.

²⁸⁵ For commentary suggesting that current disclosure doctrines do not provide that assurance, *see, e.g.*, Herbert Hovenkamp, *Patents, Property, and Competition Policy*, 34 J. CORP. L. 1243, 1252-53 (2009) (explaining how claim amendments might cover the subsequent invention of a rival who would have “no reasonable way of knowing that its patent invention was subject to an ‘earlier’ patent”), 1253 n.56 (concluding that the Section 112 disclosure requirements would not prevent an applicant from later “obtain[ing] legal rights over ideas that (at least in that form) never occurred to her until she saw what others were already doing”); Robert P. Merges, *Software and Patent Scope: A Report from the Middle Innings*, 85 TEX. L. REV. 1627, 1654 (2007) (“Traditional enablement law thus presents a deficiency: it cannot deal with cases . . . where a general set of teachings enables a host of embodiments but does not specifically mention or suggest particular variants that later come to light through the efforts of others.”); Mark A. Lemley & Kimberly A. Moore, *Ending Abuse of Patent Continuations*, 84 B.U. L. REV. 63, 92 (2004) (stating that the Federal Circuit has “cut back on the broad reading of the written description requirement as applied to claim changes”); Tun-Jen Chiang, *Fixing Patent Boundaries*, 108 MICH. L. REV. 523, 544 (2010) (asserting that “the written description requirement allows this initial disclosure to be vague, cursory, and buried within a laundry list”).

happens, enforcement of such claims takes the benefits of a rivals' subsequent innovation from the public domain, confers them on the patentee, and subjects the later innovator to unexpected infringement liability. That result impairs the competitive efforts of rivals²⁸⁶ and undermines the patent system's goal of fostering innovation.²⁸⁷

One way to address the problem would be to more fully incorporate into the written description requirement consideration of the PHOSITA's ability to foresee future evolution of the claims. Stated simply, the applicant would not be understood to have been in possession of the subject matter of a new or amended claim of scope broader than what the PHOSITA, on the filing date, could reasonably be expected to foresee from the specification.²⁸⁸ A step of this nature would more firmly and effectively plant in the written description requirement the protection necessary to ensure adequate public notice of the likely scope of evolving claims.²⁸⁹

3. Continuation Practice and the Broadening of Claims

Examination procedures include several mechanisms for an applicant to extend the prosecution period – potentially for many years – while maintaining the benefit of the initial

²⁸⁶See *Merges*, *supra* note 285, at 1653-54 (arguing that these amendments cover embodiments that “are more properly attributed to the labor of others” and terming the applicant’s conduct “misappropriation by amendment”); Lemley & Moore, *supra* note 285, at 111 (terming use of continuations “to obtain claims to read on a competitor’s product where the patentee had not contemplated the embodiment prior to seeing the competitor’s device” a “particularly offensive practice”); Chiang, *supra* note 285, at 526, 545, and 561 (arguing that allowing patent amendments to capture unforeseen developments merely confers a windfall, contributing little to the patentee’s innovation incentives while “creat[ing] monopoly cost”).

²⁸⁷See Hovenkamp, *supra* note 285, at 1253 (asserting that to the extent that patentees can amend claims to cover “the existing inventions of other inventors who did not have adequate prior notice of them, the policy reduces rather than increases the incentive to innovate”); Lemley & Moore, *supra* note 285, at 78-79 (“Strategic claim changes may hold-up legitimate improvers or independent inventors, reducing their ability and incentive to innovate.”).

²⁸⁸Indeed, in one context, the Federal Circuit already has taken a step in this direction. In *In re Curtis*, 354 F.3d 1347 (Fed. Cir. 2004), the court refused to find adequate support in a description of dental floss coated with microcrystalline wax for subsequent claims covering dental floss using “friction enhancing coatings.” The court asked whether “the later-claimed genus” would “‘naturally occur’ to a person of ordinary skill upon reading the disclosure.” *Id.* at 1356. It reasoned that “unpredictability in performance” of friction-enhancing coatings made it inappropriate to conclude that the written description would put a PHOSITA in possession of the full range of later-claimed coatings. *Id.* at 1355, 1358. The focus on what a PHOSITA could reasonably predict from the written description represents the kind of analysis we are urging.

²⁸⁹Other suggestions for addressing these issues have included reforming the traditional enablement inquiry or barring the applicant from amending claims to cover features copied from a rival’s product. See *Merges*, *supra* note 285, at 1654-56; *see also infra* Section IV.C.3. (discussing possible intervening or prior-use protections from claims broadened through continuations).

filing date. So long as the original application's specification contains adequate support for any claim additions or amendments, these "continuation practices"²⁹⁰ provide a means for broadening the coverage of its claims. But late-claiming through continuations can be used opportunistically and "[t]he potential for anticompetitive hold-up increases the longer it takes for the broader claims to emerge."²⁹¹ This section addresses steps to alleviate these concerns through limitations on the consequences of continuation practice.

Continuations are not the source of the notice problem regarding evolving claims, but they serve to extend the period of new-claim gestation and thereby raise third-party exposure based on intervening market commitments. None of the panelists at the March 19, 2009 notice panel disagreed with the proposition that there is tension between continuation practice and notice.

Continuations, of course, may serve legitimate needs. Hearing testimony provided ample evidence that in fields like biotechnology, the prolonged conversation between applicant and examiner that continuations facilitate is sometimes necessary to adequately educate, and come to an understanding with, the examiner.²⁹² Testimony also indicated that continuations may be useful for refining the language of claims to provide coverage that the applicant had sought from the start²⁹³ or for efficiently allocating scarce prosecution resources.²⁹⁴ Other justifications for

²⁹⁰The procedure may take various forms. It may involve a new application, which might be a "continuation application," retaining the original written description and the original filing date; a "continuation-in-part," which adds some new matter to the disclosures and loses the original filing date insofar as its claims rely on the new matter; or a "divisional," which separates independent and distinct inventions covered by the initial application while retaining the original filing date. *See* 35 U.S.C. §§ 120-21; 37 C.F.R. § 1.53(b). Alternatively the applicant may file a "request for continued examination" ("RCE"), which works to extend the examination of the original application. *See* 35 U.S.C. § 132(b); 37 C.F.R. § 1.114. For ease of exposition, this discussion refers to all of these variants, including those portions of continuations-in-part that maintain the original filing date, as "continuations," "continuing applications," or "continuation practice."

²⁹¹2003 FTC IP Report, ch. 4, at 27-28.

²⁹²*See* Rea at 228 (3/19/09) ("[I]n the area of biotechnology, in particular, it takes a number of continuing applications typically to arrive at allowable subject matter with the examiner."); Shema at 59 (5/4/09) ("[I]t takes a while to educate the examiner. . . . [F]rankly, the examiner often doesn't read the whole application the first time through."); Norviel at 119 (5/5/09); *cf.* Kunin at 240-41 (3/19/09) (stating that RCEs in the electrical arts have largely been a result of examiners "not really understanding").

²⁹³*See* Watt at 61 (5/4/09) (arguing that rather than an effort to enlarge claim scope, continuations are "more an effort to come to an agreement with the patent examiners, what's the right language, what are the right words to use to describe your invention in the claims").

²⁹⁴*See* Katznelson at 46-47 (3/18/09) (suggesting that to limit expense, applicants may focus first on claims that they know they will need within two or three years, while putting aside the others); Watt at 66 (5/4/09) (explaining that "you can't appeal everything, so you need other avenues in order to continue to

prolonged continuation practice – contentions that an applicant acquires a better understanding of his or her own product over time or that the product for which coverage is sought changes over time²⁹⁵ – seem more debatable. Such contentions could be used to justify a wide range of conduct, from narrowing the claim to more clearly cover the applicant’s ultimate product niche to strategically broadening claim language to cover rivals’ subsequent development of products that the applicant never envisioned when filing the initial application. A “better understanding” of the latter type is contrary to notice goals and hardly a justification for continuations.²⁹⁶ However, an important middle ground – ensuring protection of an early-filing inventor’s eventual, commercial product²⁹⁷ – invokes difficult trade-offs between providing desirable public notice and offering patent protection of appropriate scope.²⁹⁸

Given the benefits of continuations, the FTC has not urged their prohibition. Rather, the 2003 FTC IP Report focused on ways to limit the potential competitive harm from continuation practice.²⁹⁹ It recommended the enactment of legislation to protect from infringement actions

pursue your rights in the Patent Office”).

²⁹⁵ See Katznelson at 47-48 (3/18/09) (justifying continuations on the basis that “there comes a time when you find other features of the invention that turn out to be important and worthy of protection, and then at that point, you want to file additional claims”); Shema at 59-60 (5/4/09) (citing “situations where you learn more about the particular variations of your invention as data are developed” and wish to claim one of the disclosed structures more “specifically”); Watt at 66 (5/4/09) (describing continuations as “a very useful tool in order to pursue [the] full scope of inventions that you disclose in your patent application”); *cf.* Kiani at 49 (3/18/09) (“[T]here’s no way the initial patent you filed with the claims you filed will end up protecting the invention disclosed.”).

²⁹⁶ See Hovenkamp, *supra* note 285, at 1253 (“The possibility of such abuses reveals one of the more deficient aspects of the patent system’s failure to provide adequate notice to inventors.”); *see also supra* Section IV.C.2.b.

²⁹⁷ See Shafmaster at 234-35 (3/18/09) (explaining that applications are filed based on “work that’s being done at the bench” and that as clinical trials progress, “all that time you’re learning more about the drug and how it works and how to formulate it and how to dose it, and the continuation practice allows us to ultimately come out with stronger patents that are more specifically directed toward the final product”).

²⁹⁸ See Cotropia at 246 (3/19/09) (urging that in considering notice, we also consider the substantive effects on situations where “people are filing continuations not to try to capture other people, but to change as their development changes, as they go along”). Of course a key question is whether an applicant who was still developing an invention was truly in possession of the later developments at the time the application was filed. *See supra* Section IV.C.2.b.

²⁹⁹ 2003 FTC IP Report, ch. 4, at 26-31. In 2006 the FTC filed comments supporting a proposed PTO rule that would have allowed one continuation as of right and subsequent continuations when the amendment, argument, or evidence contained in the filing could not have been submitted earlier. The proposed rule was the subject of litigation, *see Tafas v. Doll*, 559 F.3d 1345 (Fed. Cir. 2009), *vacatur denied*, 586 F.3d 1369 (Fed. Cir. 2009), and the PTO has now dropped its proposal. The Commission’s current recommendations would not limit the number of allowable continuations or the circumstances under

third parties who (i) infringe patents only because of claim amendments (or new claims) following a continuation and (ii) developed, used, or made substantial preparation for using, the relevant product or process before the amended (or newly added) claims were published.³⁰⁰ As the Commission explained:

Creating intervening or prior user rights would most directly cure potential competitive problems without interfering with legitimate needs for continuations, reducing business uncertainty without increasing costs of error. . . . This would protect third parties from hold-ups derived from any extended period of secrecy made possible by continuations, while allowing the patent to be enforced against those who would have infringed a properly described pre-continuation claim or who had timely opportunity to gain knowledge of the amendments.³⁰¹

We reiterate the 2003 recommendation here.

Some panelists urged going beyond this by providing broader protection for prior users or independent invention.³⁰² Typically, their proposals reflected a concern that the sheer number of patents sometimes makes clearance extraordinarily difficult. These proposals are discussed in the next section.

Recommendations: evolving and pending claims. (1) The Commission recommends legislation requiring publication of patent applications 18 months after filing, whether or not the applicant also has sought patent protection abroad (subject to possible adjustments to provide any necessary protection to independent inventors). (2) The Commission recommends that consideration of the PHOSITA's ability to foresee future evolution of the claims be more fully incorporated into application of the written description requirement; the applicant should not be understood to have been in possession of the subject matter of a new or amended claim of scope broader than what the PHOSITA, on the filing date, could reasonably be expected to foresee from the specification. (3) The Commission recommends enactment of legislation to protect from infringement actions third parties who (i) infringe properly described claims only because of claim amendments (or new claims) following a continuation and (ii) developed, used, or made substantial preparation for using, the relevant product or process before the amended (or newly added) claims were published. (4) The Commission recommends that the PTO receive the funding and information systems needed to promptly and properly examine the many applications that it faces.

which continuations may be filed.

³⁰⁰2003 FTC IP Report, ch. 4, at 31.

³⁰¹*Id.*, ch. 4, at 29-30.

³⁰²*See infra* Section IV.D.3.

D. Improving the Ability to Sift Through a Multitude of Patents

Searching through a mass of patents and applications to identify and review those that are potentially relevant to a new product can be a daunting undertaking. Although in some industries reliable searches apparently are regularly performed,³⁰³ panelists reported that in IT and related industries a thorough clearance search is often infeasible or cost prohibitive.³⁰⁴ In addition to the sheer number of patents, testimony emphasized that unclear claim language and the diverse ways in which claims might be expressed make search less effective.³⁰⁵

This section addresses policies that could improve the efficiency of clearance searches, concentrating on areas in which the PTO might improve the data available to searchers.³⁰⁶ These include augmenting and/or modifying the PTO's classification system, improving the likelihood that text-based searches will identify relevant patents, and taking steps to ensure that patent assignments are promptly recorded with the Patent Office. The section concludes by reviewing certain suggestions for departing from strict liability norms due to concerns arising from lack of notice or related considerations.

³⁰³ See, e.g., McNelis at 24-26 (5/5/09) (explaining that in life sciences you can be "confident that you're finding those patents that are right on top of what you are doing").

³⁰⁴ See, e.g., Yen at 53-54 (12/05/08) ("It is impossible to achieve any degree of certainty by such clearance searches with today's systems."); Bessen at 47 (3/19/09) (opining that it has become very difficult or impossible to perform an efficient clearance search in these industries); *see also supra* Section III.C.

³⁰⁵ See, e.g., Sprigman at 34 (2/12/09); Vermont at 164 (4/17/09); Horton at 175 (3/18/09); McNelis at 26-27 (5/5/09).

³⁰⁶ By improving the efficiency of patent review, earlier recommendations to promote clearer boundaries can also expedite the search process.

1. Improving the Ability to Search for Relevant Patents

a. Background

Firms conducting a clearance search can avail themselves of a wide variety of resources.³⁰⁷ Of principal importance are issued patents and documents created during the prosecution. These documents are publicly accessible and generally are organized using the PTO's Patent Classification System of about 400 classes and 120,000 subclasses.³⁰⁸ The classes are based on analyses of patent disclosures,³⁰⁹ and the system groups inventions based on their "proximate function," i.e., use of "similar processes or structures that achieve similar results."³¹⁰ Examiners employ this system to identify prior art and also to assign primary and secondary classifications to each patent granted (and each published application).³¹¹ The PTO and the European Patent Office (EPO) recently have begun to work toward development of a cooperative patent classification system.³¹²

Due to the advent of computerized databases, patent searching is now generally performed electronically.³¹³ The PTO offers full text search of a database, including the full text of all patents and some associated information, such as classification and issue date. The system permits search using simple Boolean operators, but does not rank the results, merely reporting

³⁰⁷See generally DAVID HUNT, LONG NGUYEN & MATTHEW RODGERS, *PATENT SEARCHING: TOOLS & TECHNIQUES* (2007).

³⁰⁸See Bronwyn H. Hall, Adam B. Jaffe & Manuel Trajtenberg, *The NBER Patent Citations Data File: Lessons, Insights and Methodological Tools* (Nat'l Bureau of Econ. Research, Working Paper No. 8498, 2001), available at <http://www.nber.org/papers/w8498>.

³⁰⁹See USPTO, Examiner Handbook to the U.S. Patent Classification System, ch.1, § B ("A fundamental principle of the USPC system is that each class, or part thereof, was created by: 1. analyzing the claimed disclosures of the U.S. patents [and] 2. creating various divisions and subdivisions on the basis of that analysis rather than by making a theoretical arrangement or ordering . . ."), available at <http://www.uspto.gov/patents/resources/classification/handbook/index.jsp>.

³¹⁰*Id.* at ch.1, § A.2.

³¹¹*Id.* at ch.1, § B.

³¹²See USPTO, Press Release, 11-09, USPTO and EPO Reach Agreement on Principles of Cooperative Patent Classification System (Feb. 4, 2011), available at http://www.uspto.gov/news/pr/2011/11_09.jsp; USPTO, Press Release, 10-51, USPTO and EPO Work Toward Joint Patent Classification System (Oct. 25, 2010), available at http://www.uspto.gov/news/pr/2010/10_51.jsp. Their efforts will seek alignment with the International Patent Classification system while achieving a greater level of detail. *Id.*

³¹³See, e.g., Andrew Chin, *Search for Tomorrow: Some Side Effects of Patent Office Automation*, 87 N.C. L. REV. 1617 (2009) (discussing the impact of electronic search methods on patent searches).

them in reverse chronological order.³¹⁴ Commercial services also permit searches of patent documents. They frequently permit enhanced searches (e.g., complex algorithms and search operators), while scoring results so that the potentially more relevant results can be presented first.³¹⁵

b. Analysis

U.S. patent classification system. The current classification system, derived from the PTO's experience with patents, often differs from industry-based classifications.³¹⁶ Testimony suggested that it could significantly aid search if the PTO added industry-based classifications to its system.³¹⁷ To implement this proposal, the PTO could instruct examiners to classify patents not only using the U.S. Patent Classification System, but also under industry classification systems, so that a search could be conducted using either or both. In addition, the PTO and EPO might consult industry classification systems in developing their new, cooperative system.

Predictable terminology for searching. The lack of a common, predictable terminology, already identified as a concern affecting patent clarity, particularly in IT, also undermines effective patent searching. Panelists noted that variation in the terms used to describe inventions can limit the effectiveness of electronic database searches³¹⁸ and called for "taxonomical advances" to better represent the "intellectual space" to be searched, "ideally . . . the equivalent of periodic tables in the IT fields."³¹⁹

Improvement might come from the applicants. If vocabularies for claiming were more standardized, researchers could use search terms with greater confidence of finding relevant

³¹⁴See Shigeyuki Sakurai & Alfonso F. Cardenas, *An Analysis of Patent Search Systems*, 90 J. PAT. & TRADEMARK OFF. SOC'Y 448, 449 & tbl. 1 (2008). The PTO also makes the file history available online through PAIR. See *supra* Section III.B.

³¹⁵See *id.* at 449 & tbl. 1 (describing search capabilities of the USPTO, Google Patent Search, Delphion, PatentCafe and LexisNexis, among others).

³¹⁶See Kunin at 262 (3/19/09).

³¹⁷*Id.* (maintaining that such a step would be "a great addition for industry"); Rai at 262 (3/19/09) (concurring "very strongly" and reporting "that examiners have been wanting a change in th[e] classification system for a while").

³¹⁸See Horton at 174-75 (03/18/09) (explaining that a software invention may be described in different ways, making "the automated portion of finding the right prior art [] a little more . . . challenging"); *cf.* Martin Comment at 13 (5/15/2009) (explaining that patent claims "do not follow the symbolic rules and procedures adopted by the field of software engineers as their domain").

³¹⁹Menell at 30-31 (5/5/09).

patents.³²⁰ In discussing ways to enhance patent clarity, a prior recommendation urged the PTO to “convene a government/industry task force or hold a workshop to explore ways of fostering greater uniformity in the methodology or language used for describing and claiming software inventions.”³²¹ The same inquiry could simultaneously explore ways to develop and promote greater uniformity for purposes of enhancing search capabilities.

Improvement might also come from the examiners. In addition to implementing the industry-based classification system, discussed above, examiners could also provide search-friendly lists of descriptive terms for applications under review and patents ready for issuance.

Full-text searching on PAIR. As discussed above in Section III.B., the PTO makes file history information available through PAIR. While PAIR is an effective tool for following a particular application, it does not provide full-text search capabilities.³²² Ability to quickly search the prosecution history would likely enhance clearance efforts in the face of large numbers of potentially relevant patents.³²³ Recently, one subscription service has announced the availability of full-text search of file histories.³²⁴ Developments of this type could prove very helpful for notice purposes.³²⁵

2. Identifying Patent Assignees

a. Background

A patentee is free to assign (i.e., sell) his or her patent to another party, thereby transferring the right to exclude conferred by the patent. At their option, parties can record assignments with the PTO by paying a fee and filing a form that lists for public review the assignee’s name, a contact person, and an address.³²⁶ Neither the Patent Act nor PTO regulations

³²⁰Similarly, requiring that terms be defined might also improve the reliability of using electronic search mechanisms because definitions might include terms used in a search query.

³²¹*Supra* Section IV.B.1.b.

³²²*See* Kunin at 260 (3/19/09); Private PAIR Quick Start Guide, *available at* http://www.uspto.gov/patents/process/status/private_pair/PrivPairOverview_Oct09.pdf.

³²³*See* Kunin at 260 (3/19/09) (urging that “having a full text searchable file history will provide a much better notice function”); NAS REPORT, *supra* note 267, at 105 (recommending that an electronic version of the prosecution history be made available upon publication of the patent application).

³²⁴*See* Westlaw Database Directory, US-PAT-IIISTORY summary, *available at* <http://directory.westlaw.com/scope/default.asp?db=US-PAT-HISTORY&RS=W...&VR=2.0>.

³²⁵Making PTO data easily accessible to industry and the public and expanding access through the worldwide web are objectives cited in the PTO Strategic Plan, *supra* note 264, at 40.

³²⁶*See* MPEP §§ 301-24.

require such recordation, although an assignment not recorded with the PTO is “void as against any subsequent purchaser” who lacks notice of the assignment.³²⁷ As a result, while the records are open to the public,³²⁸ they do not include all assignments.

Panelists reported that under this voluntary system, PTO records provide poor notice regarding current ownership of patents.³²⁹ Testimony suggested that parties often fail to report assignments to the PTO³³⁰ or list “shell companies” as assignees, “making it as difficult as possible, apparently, to trace back to the true assignee of the patent.”³³¹ Moreover, testimony indicated, the information is difficult to locate: it is “buried somewhere on the website” rather than included with the patent record.³³²

b. Analysis

Assignment records play an important role in clearing patent rights. One strategy for navigating an environment with many potentially relevant patents is to concentrate clearance efforts on patents held by competitors or others who are likely to sue.³³³ This strategy falters if the public lacks notice of assignments. Moreover, if the clearance search determines that a patent

³²⁷ 35 U.S.C. § 261. The PTO does require proof of assignment to permit an assignee to take certain actions as owner of the patent or application in PTO proceedings. *See* 37 C.F.R. § 3.73.

³²⁸ *See* 37 C.F.R. 1.12.

³²⁹ *See, e.g.*, Graham at 236 (4/17/09) (describing the PTO’s patent reassignment data as “notoriously just not good”); McNelis at 27 (5/5/09) (“[T]he assignments are not always in order.”); Slifer at 112 (3/18/09) (indicating that patent ownership is “difficult to ascertain”).

³³⁰ *See* Wagner at 236 (4/17/09) (explaining that “the vast majority of people just don’t” file reports, or if they do “it’s late”); Rai at 263 (3/19/09) (noting concerns that reporting of assignments “doesn’t happen very often”); Harris at 113 (3/18/09).

³³¹ Kappos at 265 (3/19/09); *see also* Slifer at 113 (3/18/09) (reporting evidence that companies list “shell corporations” as part of “some intentional hiding of . . . who’s the true party in interest”); McNelis at 27 (5/5/09) (asserting that search is more difficult and costly because “some companies like to play games with the assignments”).

³³² Hall at 287 (5/4/09).

³³³ *See* McNelis at 27 (5/5/09) (“one of the strategies we employed” when there are many potentially relevant patents, “was to take a look at their major competitors”); Phelps at 262 (5/4/09) (describing search efforts focused on the portfolios of specific companies); Durie at 18 (5/5/09) (discussing a clearance search focused on the portfolio of a single company); DeVore at 43 (5/4/09) (explaining that freedom to operate analyses have grown “more savvy” by distinguishing between patents held by parties likely to grant nonexclusive licenses and patents held by close competitors); *cf.* Durie at 19 (5/5/09) (litigation risk is “a function . . . [of] underlying business considerations” that depend on knowing: “Who’s holding the patent?”).

is a problem, knowing the owner is essential to seeking a license. Indeed, information on the owner can be essential for a firm to determine if it already has rights to the patent via a cross-license.³³⁴ Recordation of assignments would help with these notice problems.³³⁵

In light of these considerations, the filing and public recordation of assignments of patents and published patent applications, including identification of the real party in interest, should be required by a statutory change. A patent confers a right to exclude, and it is important to clearance efforts that the public faced with that right have a ready means of identifying the owner. Arguably, public notice of a transfer may reveal some information about the parties' business efforts and strategies,³³⁶ but similar information must be provided when filing any patent application, and the inventor and any assignees are identified when a patent issues. In each case, the public benefits from knowing the identity of current applicants/patent holders. Recording assignments of government-conferred rights to exclude is necessary to ensure public notice and will not unduly burden patent transfers.

3. Modifying Liability for Inadvertent Infringement

Consistent with the notice problems described in this chapter, recent studies show that patent infringement litigation very often seeks to recover from inadvertent infringers, i.e., those who used a patented technology not knowing that it was covered by a patent.³³⁷ Scholars have recognized that the current system imposes information costs on technology users, a form of "notice externality,"³³⁸ and have addressed the possibility of modifying the rule of strict liability

³³⁴See Kappos at 265 (3/19/09).

³³⁵See Kappos at 265 (3/19/09) (urging identification of assignees of published applications); Rivette, at 37-38 (5/5/09) ("the assignment database . . . has to be something that we fix"); Rai at 263 (3/19/09) (suggesting that it would aid freedom to operate assessments to know who the "actual assignees" of the patent are).

³³⁶See Hoffman at 103 (4/17/09) (explaining that such information can indicate the technology areas that a firm is pursuing or abandoning); Malackowski at 102 (4/17/09) (arguing that firms ought to be able to keep their strategies secret).

³³⁷See, e.g., Christopher A. Cotropia & Mark A. Lemley, *Copying in Patent Law*, 87 N.C. L. REV. 1421, 1462 (2009) ("The overwhelming majority of defendants are independent developers who were unaware of the existence of the patent when they made their product design decisions."); BESSEN & MEURER, *supra* note 16, at ch. 3 (describing the extent and causes of inadvertent infringement); see also Meurer at 207 (12/5/09) (stating that only "in about 4 percent of the cases is the defendant ever shown to be a copyist"); Durie at 124-25 (5/5/09) (describing how many infringers "did not and could not plausibly have received actual notice of the patent at the time they [were] making design choices relating to their products").

³³⁸Menell at 29 (5/5/09); see also Clarisa Long, *Information Costs in Patent and Copyright*, 90 VA. L. REV. 465 (2004); cf. Blair & Cotter, *supra* note 12, at 800-08 (observing that in light of marking requirements, 35 U.S.C. § 287, patent law is not a pure strict liability system).

or the allocation of burdens for supplying and seeking information to accommodate concerns regarding inadvertent infringement.³³⁹ Several panelists expressed similar ideas.³⁴⁰

Arguments supporting such proposals include the fact that strict liability may have little deterrent effect on inadvertent infringement³⁴¹ and may promote inefficiently high levels of search effort,³⁴² while burdening beneficial innovative activities.³⁴³ On the other hand, some question whether inadvertent infringement is really innocent in many cases.³⁴⁴ Other testimony argued that such a defense would create strong incentives to remain ignorant of patents³⁴⁵ and scholars have warned that the difficulty of proving intentional infringement may enable actual

³³⁹ See, e.g., Blair & Cotter, *supra* note 12, at 840-41 (suggesting adoption of an “‘actual knowledge’ standard” in “a few discrete situations”); BESSEN & MEURER, *supra* note 16, at 249 (2008) (suggesting that “[i]t might be desirable to reform patent law by simply excusing good-faith infringe[ment]”); Henry E. Smith, *Intellectual Property as Property: Delineating Entitlements in Information*, 116 YALE L.J. 1742, 1818 (2007) (recognizing concerns about “inadvertent infringement” and noting the possibility that limiting remedies to damages rather than injunctive relief may be appropriate in some circumstances); John M. Golden, *Principles for Patent Remedies*, 88 TEX. L. REV. 505, 554 (2010) (“[I]f lack of timely and effective notice of patent rights helps to cause much infringement, a patentee might be the cheapest cost avoider for the social costs of poor notice. Under such circumstances, reduced remedies for inadvertent infringement might optimally spur patentees to improve patent notice.”).

³⁴⁰ See, e.g., Menell at 36 (5/5/09) (suggesting that an independent invention defense or limitation of remedies could reduce notice problems); McCurdy at 69-70 (12/5/08) (arguing that an independent invention defense works well for technologies like software, where invention is ubiquitous and the information costs of determining who invented what are high); Schultz at 131-32 (5/5/09) (suggesting that damages might be reduced when patents are relatively ambiguous or notice is poor); Durie at 124-25 (5/5/09) (arguing that damages paid by inadvertent infringers should reflect the fact that lack of notice undermined their opportunity to evaluate alternative technology); cf. Squires at 192 (12/5/08) (“Where there are fuzzy boundaries and non-existent or imperfect notice,” strict liability is “a big weight to bring down.”). But cf. Cotter at 193 (12/5/08) (“I don’t think anybody wants to abandon strict liability for patent infringement as a general principle.”).

³⁴¹ See, e.g., Cotropia & Lemley, *supra* note 337, at 1463 (criticizing damage awards based on deterrence goals because deterrence has “no place in a patent regime where virtually all infringement is unintentional”).

³⁴² See, e.g., Stewart E. Sterk, *Property Rules, Liability Rules, and Uncertainty about Property Rights*, 106 MICH. L. REV. 1285, 1308-11 (2008).

³⁴³ See *supra* Section II.

³⁴⁴ See, e.g., Dickinson at 191 (12/5/08) (suggesting that independent inventors may be “willful infringers . . . that haven’t studied the art”); Rhodes at 217-18 (2/12/09).

³⁴⁵ See, e.g., Rhodes at 218 (2/12/09) (“[W]e would be encouraging firms not to read patents so they can try to avail themselves of the inadvertent defense.”); Golden at 95 (2/12/09) (noting the importance of considering whether an infringer used “proper diligence”).

copyists to avoid liability.³⁴⁶ Moreover, some argue that notice problems are concentrated in certain industries, so that it would be an error to tamper with remedies across the board.³⁴⁷

Recently, attention has focused on a defense protecting inadvertent infringement resulting from “independent invention.” While this defense can be defined broadly to cover most inadvertent infringement, leading proponents have concentrated on modifying liability in situations involving nearly simultaneous invention.³⁴⁸ Even this narrow defense has drawn considerable criticism.³⁴⁹ Broader formulations, more consistent with the inadvertent infringement concept, would permit the defense to be raised even if the patent has been published,³⁵⁰ but raise serious problems proving that the inventor invented independently.³⁵¹

An alternative would be “prior user rights,” which protect those who use the patented technology (e.g., as a trade secret) before the patentee seeks or obtains the patent, enabling the prior users to continue practicing the technology without a licence. Virtually all EU jurisdictions recognize this defense, although it is seldom invoked in courts.³⁵² U.S. law currently recognizes a very narrow prior user defense in the business methods context.³⁵³ Some scholars have

³⁴⁶See Blair & Cotter, *supra* note 12, at 814.

³⁴⁷See Rhodes at 216-17 (2/12/09).

³⁴⁸See Samson Vermont, *Independent Invention as a Defense to Patent Infringement*, 105 MICH. L. REV. 475, 484-89 (2006) (proposing a defense limited to situations in which a firm independently invented after the patentee invented, but before the firm was on constructive notice through publication of the patent (or application)); Vermont at 163-64 (4/17/09); Carl Shapiro, *Prior User Rights*, 96 AM. ECON. REV. 92 (2006) (analyzing the effects of a similar system and finding that it has “very attractive properties,” specifically, “competition is enhanced, innovation is rewarded”).

³⁴⁹See Lemley, *supra* note 13; Wagner 228 (4/17/09); Verizon Communications Inc. Comment at 6 (5/5/09). Some analysts have agreed that the circumstance of near-simultaneous invention is significant, but suggest that it be applied mainly in assessing whether the invention was obvious. See Lemley, *supra* note 13, at 1534-35; Hall at 210-11 (5/4/09); see generally Vermont at 171-72 (4/17/09) (discussing the role of independent invention as an objective indicator of obviousness).

³⁵⁰See Stephen M. Maurer & Suzanne Scotchmer, *The Independent Invention Defense in Intellectual Property*, 69 ECONOMICA 535 (2002) (arguing in favor of such a defense).

³⁵¹See Vermont, *supra* note 348, at 475.

³⁵²P. Van Eecke, J. Kelly, P. Bolger & M. Truyens, *Monitoring and analysis of technology transfer and intellectual property regimes and their use*, Results of a study carried out on behalf of the European Commission (DG Research), ch. 2 (August 2009) (describing the contours of the defense in various EU jurisdictions), available at <http://www.eutechnologytransfer.eu/files3/report.pdf>.

³⁵³35 U.S.C. 273; see also Cockburn at 227-28 (4/17/09) (observing that prior user rights have had little impact in the business method patent area).

proposed broadening the existing provision,³⁵⁴ and pending legislation calls for the PTO to study the impact of such rights in other countries.³⁵⁵

In sum, considerable evidence suggests that notice problems have contributed to widespread inadvertent infringement in some industries.³⁵⁶ If efforts to improve notice do not succeed, consideration of modifications to strict liability may be appropriate. But a substantial change along these lines could result in a “dramatically different” patent system,³⁵⁷ and legal and economic knowledge in this area is too limited to adequately assess specific reform proposals.³⁵⁸ Under these circumstances, research designed to better understand how modifications to strict liability for patent infringement would affect incentives to invent and innovate would be desirable.

Recommendations: sifting through a multiplicity of patents. (1) The Commission recommends that the PTO instruct examiners to classify patents using an industry-based classification system, as well as the PTO classification system, in art units where the additional classifications would significantly improve public notice. The Commission further recommends that the PTO explore mechanisms for encouraging examiners to compile search-friendly lists of descriptive terms for applications under review and patents ready for issuance. (2) The Commission urges that the PTO explore with the software industry whether ways might be devised to foster greater uniformity in the methodology or language used for describing and claiming inventions, as a means of enhancing search capabilities. (3) The Commission recommends the enactment of legislation requiring the public recordation of assignments of patents and published patent applications. To ensure that such listings provide maximum benefit to public notice, they should identify both the formal assignee and the real party in interest.

V. CONCLUSION

Patent notice is a vital aid to competition and innovation. Effective notice fosters efficient innovation investment by enabling firms to select technologies with knowledge of applicable patent rights. It removes uncertainty, which causes some firms to shy away from procompetitive innovation for fear of the penumbra that surrounds a patent’s actual reach, and which induces others to engage unnecessarily in costly design-around efforts. It shelters firms that move ahead with product introduction from the risk of expensive and disruptive litigation over unexpected patent assertions and the need to pay higher royalties than they would have negotiated before launch. It fosters the shared understanding and accurate valuation of IP rights

³⁵⁴See, e.g., BESSEN & MEURER, *supra* note 16, at 249-51.

³⁵⁵See Patent Reform Act of 2011, S. 23, 112th Cong., 1st Sess. § 2(n) (2011).

³⁵⁶See *supra* Section III.

³⁵⁷See Cotropia & Lemley, *supra* note 337, at 1460.

³⁵⁸See Blair & Cotter, *supra* note 12, at 840 (noting the absence of relevant empirical evidence).

that supports collaboration among firms with complementary expertise and promotes competition among inventions in efficient technology markets.

Patent notice concerns derive from a variety of sources, including difficulties in interpreting the boundaries of issued claims, difficulties in foreseeing evolving claims, and difficulties in sifting through a multitude of patents. The presence and severity of these challenges vary greatly among industries. At the Commission's hearings, by far the most serious concerns were identified in the IT sector, where some panelists declared it "virtually impossible" to conduct meaningful patent clearance. In contrast, panelists from the pharmaceutical and biotech sectors generally found the patent system's notice function well, or at least adequately, served.

Solutions require care and balance. We have looked for mechanisms that provide notice early, avoid unnecessary burdens, and assign responsibilities to the least-cost providers. We have tried to avoid recommendations that might unnecessarily burden industries where notice problems are manageable. We recognize that some mechanisms for enhancing notice raise trade-offs between notice objectives and patent scope. In most instances, we have highlighted the need for notice considerations to weigh heavily, while leaving it to the patent system to balance those considerations against any impact on the scope of patent protection. And we have looked for solutions that enhance notice without significantly affecting scope.

With these considerations in mind, this chapter seeks ways to improve notice by addressing each of the basic sources of potential problems. With regard to the boundaries of existing claims, it stresses vigorous PTO application of the indefiniteness standard as a way of removing ambiguity and suggests ways to improve the utility of the specification and prosecution history to make claim construction more predictable for third parties. With regard to evolving claims, after stressing the need for adequate PTO funding, it urges broader publication of applications, application of the written description requirement with notice concerns in mind, and some protection for prior users first covered by claims broadened through continuations. To address the difficulties posed in some industries by the sheer number of claims, it suggests ways to improve the search for relevant patents and to identify patent assignees.

Plainly, notice problems are substantial, varied in source, and often highly challenging. Yet with the challenges comes an opportunity to remove impediments to, and strengthen the infrastructure for, competition and innovation. Because the potential benefits are large, the concerns raised by this chapter require prompt attention, and the suggested improvements warrant thorough consideration.

CHAPTER 4
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CHAPTER 4

THE ECONOMIC AND LEGAL FOUNDATIONS OF PATENT REMEDIES

I. INTRODUCTION

Patent owners can offer their patented inventions in the marketplace. They can sell a patented product or transfer their technology for development and commercialization by others. In either case, the market reward earned by a patentee will depend upon the invention's contribution – the extent to which consumers prefer it over alternatives and prior technology. Patent remedies play an important role in protecting the ability of patent holders to earn returns in the marketplace by deterring infringement and compensating patentees when infringement occurs. Patent remedies also play a central role in ex post patent transactions by establishing the legal shadow in which negotiations occur.

For remedies to protect the patent system's incentives to innovate and avoid distorting competition among technologies, they must replicate the reward the patentee would have earned in the market absent infringement. The Patent Act incorporates this fundamental goal of fully compensating patentees for infringement by requiring that a court award a successful patentee damages "adequate to compensate for the infringement." Courts have defined damages "adequate to compensate" as those that make the patent owner whole by placing it in the position it would have been but for the infringement. This standard, when accurately implemented, aligns patent law and competition policy by supporting the patent system's incentives to innovate while allowing consumers to benefit from competition among technologies.

The ability of current patent remedies law to carry out this role successfully is unclear. The patent community vigorously debates whether reasonable royalty damages law appropriately compensates patentees. It also struggles to understand the full implications of the Supreme Court's *eBay* decision, which overturned assumptions that every patentee who proved infringement in court would receive a permanent injunction. Gauging the accuracy of remedies rules in replicating the market reward that patentees would have earned absent infringement may not be possible. But as one commentator explains, "much of the law on patent damages obscures the effort to match damage awards to the economic values of inventions."¹ To address this criticism, this report seeks to derive an economically grounded approach for analyzing patent remedies and to test the current legal rules for calculating damages and awarding injunctions against that approach.

II. THE MARKET ALIGNS REWARD AND CONTRIBUTION THROUGH COMPETITION

An important benefit of the patent system, in contrast to other methods of encouraging innovation, like direct prizes, is that it allows each invention to be valued directly through a

¹Schlicher Comment at 4, 38 (5/15/09).

market mechanism.² A patentee can obtain a financial reward for its patent by producing a product that incorporates the invention or by transferring the technology through a patent license or sale to a manufacturer who develops and produces a product. The market reward³ earned by the patentee in either case will depend upon the extent to which consumers prefer the patented invention over alternatives and prior technology, which helps determine the invention's economic value.

A patented invention may present a small improvement over known technology or a radical departure that displaces what came before. In some cases, patents will protect a “disruptive” technology – a technology that creates “competition which commands a decisive cost or quality advantage and which strikes not at the margins of the profits and the outputs of the existing firms but at their foundations and their very lives.”⁴ A patent covering such a technology can confer market power on the patentee and generate the possibility of monopoly profits and significant market rewards.

Many patented inventions, however, compete with a range of acceptable alternatives, which limit the patent owner's ability to obtain a monopoly profit.⁵ A patent can protect a new product from competition with other products incorporating the same invention, but it cannot protect a new product from those similar products that adopt alternative, noninfringing technologies. Products incorporating patented technology often compete in product markets. Patented technologies can also compete in technology markets to be chosen for development and incorporation into new products. Through this competition, product developers can reject technologies whose cost is more or whose value is less than that of available alternatives.

²Kenneth W. Dam, *The Economic Underpinnings of Patent Law*, 23 J. LEGAL STUD. 247, 248-49 (1994); Joseph Farrell, John Hayes, Carl Shapiro & Theresa Sullivan, *Standard Setting, Patents and Hold-Up*, 74 ANTITRUST L. J. 603 (2007).

³The “market reward” defined here is the amount the patentee could have earned by either selling a patented product or licensing the patented technology in the absence of infringement.

⁴JOSEPH A. SCHUMPETER, *CAPITALISM, SOCIALISM, AND DEMOCRACY* 1942 (1976).

⁵The principle that patents do not necessarily confer market power for these reasons is widely accepted. *Ill. Tool Works, Inc. v. Indep. Ink, Inc.*, 547 U.S. 28, 45-46 (2006) (“Congress, the antitrust enforcement agencies, and most economists have all reached the conclusion that a patent does not necessarily confer market power upon the patentee. Today, we reach the same conclusion”); U.S. DEP’T OF JUSTICE & FED. TRADE COMM’N, *ANTITRUST ENFORCEMENT AND INTELLECTUAL PROPERTY RIGHTS: PROMOTING INNOVATION AND COMPETITION* (2007), ch. 1, at 22 (“Although a patent gives the patent owner the right to exclude others from making, using, or selling a particular product or process, the existence of close substitutes for the product or process may prevent the patent owner from exercising market power.”).

Consumers benefit from the competition among patented products and technologies, which lowers prices, increases quality and encourages innovation.⁶

In a well-functioning market, the more advantageous the patented invention compared to alternatives, the more consumers will prefer it, the greater its economic value, and the greater the market reward to the patent owner. “These exclusive [patent] rights are worthless if the invention turns out to be a dud, but ultimately the market decides what is valuable and what is not.”⁷ Judge Giles Rich captured this important aspect of the patent system in an often quoted statement: “[I]t is one of the legal beauties of the system that what is given by the people through their government – the patent right – is valued automatically by what is given by the patentee. His patent has value directly related to the value of his invention, as determined by the marketplace.”⁸ Competition aligns the economic value of the invention and the value of the patent. To support this alignment, the patent legal rules must not distort that competition.

The alignment of the patent system and competition affects not only the operation of product and technology markets. It also can affect the allocation of research and development resources. Under the patent system, society “funds” the often expensive process of invention, research, development and innovation by conferring exclusive rights on patentees. By aligning the patentee’s reward with the invention’s value compared to alternatives and prior technology, a well-functioning market incentivizes inventors to pursue those inventions that are more likely to be valued by consumers.⁹ In this way, market forces help to allocate research and development resources to those areas most valued by consumers. Distortions in how the market rewards patented inventions can have consequences for R&D decisions.

III. PATENT REMEDIES SEEK TO REPLICATE AND PROTECT THE MARKET REWARD FOR INVENTIONS

Remedies for patent infringement are crucial to the ability of the patent system to promote innovation by protecting innovators’ ability to reap benefits from their investments in research, development and commercialization of new products. The market can fully reward a patentee, and align that reward with the invention’s economic value over alternatives, only where there is no infringement to dilute the reward. To successfully support the patent system’s incentives to

⁶See FED. TRADE COMM’N, TO PROMOTE INNOVATION: THE PROPER BALANCE OF COMPETITION AND PATENT LAW AND POLICY, ch. 2, at 8-16 (Oct. 2003) (“2003 FTC IP Report”), *available at* <http://ftc.gov/os/2003/10/innovationrpt.pdf> (discussing how competition promotes innovation); *see also* Slifer at 77 (3/18/09) (“As detailed in the Commission’s 2003 report, Micron continues to believe that the primary drive for innovation at least in our industry is competition.”).

⁷ROGER D. BLAIR & THOMAS F. COTTER, INTELLECTUAL PROPERTY: ECONOMIC AND LEGAL DIMENSIONS OF RIGHTS AND REMEDIES 17-19 (2005).

⁸*In re Kirk*, 376 F.2d 936, 964 (C.C.P.A. 1967).

⁹BLAIR & COTTER, *supra* note 7, at 16-17.

innovate, remedies must compensate for past infringement, prohibit future infringement, and deter infringement in the first instance.

Patent remedies provide three types of redress to accomplish these tasks: compensatory damages, enhanced damages, and injunctive relief. Each plays a different but overlapping role. Compensatory damages preserve the patentee's incentive to innovate by making it whole in spite of infringement.¹⁰ Enhanced damages deter willful infringement.¹¹ Permanent injunctions preserve the patentee's exclusivity going forward and deter infringement in the first instance.¹² Enhanced damages are unique among the three remedies because they are meant to punish the infringer and so they award the patentee more than the market would have. Compensatory damages and permanent injunctions, on the other hand, are meant to serve the utilitarian goals of the patent system by allowing the patentee to reap the reward the market would have conferred, absent infringement.

To align the patent system and competition policy, it is important that compensatory damages and injunctions be assessed in a manner that aligns the patentee's compensation with the invention's economic value. Remedies do so when they either replicate the market reward in the case of compensatory damages, or protect the exclusive market position that allows the patentee to earn that reward directly, in the case of injunctions. Assessing damages or injunctions in a manner that undercompensates patentees compared to the market reward will undermine the patent systems's power to promote innovation. Overcompensation compared to the market reward can distort competition among technologies, which raises multiple problems discussed in Section C of this chapter.

A. Compensatory Damages

To compensate a patentee as the market would have, damages should be designed to return the patentee to the financial condition it would have been in but for the infringement.

¹⁰Following a finding of infringement, a court shall award damages "adequate to compensate for the infringement." 35 U.S.C. § 284.

¹¹Establishing willful infringement requires clear and convincing evidence that "the infringer acted despite an objectively high likelihood that its actions constituted infringement of a valid patent" and that "this objectively-defined risk . . . was either known or so obvious that it should have been known to the accused infringer." *In re Seagate Tech., LLC*, 497 F.3d 1360, 1371 (Fed Cir. 2007). See also Roderick R. McKelvie, Simon J. Frankel & Deanna L. Kwong, *Nine Unanswered Questions After In re Seagate Technology LLC*, 20 INTEL. PROP. TECH. L. J. 1, 1 (2008).

¹²Section 283 of the Patent Act grants district courts the discretion to issue injunctions in patent infringement cases following the principles of equity. 35 U.S.C. § 283. In its decision in *eBay*, the Supreme Court set out four factors that courts must consider in exercising that discretion. *eBay, Inc. v. MercExchange, LLC*, 547 U.S. 388, 391 (2006).

Patent damage awards should reflect the economic realities of the market by rendering the patentee no worse off, but also no better off, than it would have been absent the infringement.¹³

The law of patent damages incorporates this fundamental economic principle. The Patent Act requires that a court award a successful patentee damages “adequate to compensate for the infringement.” Damages are meant to be compensatory and not punitive.¹⁴ Courts have defined damages “adequate to compensate” as damages that make the patent owner whole by placing it in the position it would have been but for the infringement.¹⁵ The Supreme Court frames the question as “had the Infringer not infringed, what would the Patent Holder-Licensee have made?”¹⁶ As explained by a leading treatise, “[t]his is the critical starting point for any review of the various patent damages theories or even for a damages analysis in an actual case, regardless of how the damages award is computed or what that damages award is called.”¹⁷

Over the years, courts have developed an extensive jurisprudence on how to calculate compensatory damages. Current law identifies two categories, lost profits and reasonable royalties, and provides legal rules for determining which category applies and how damages should be calculated. One important method for placing the patentee in the position it would have been but for the infringement is to award it the profits that it lost due to the infringement. This approach most readily applies when the patent holder seeks to earn its return by selling a product in the marketplace. Infringing competition can reduce a patentee’s profits in a number of ways, including by diverting sales from the patentee’s product, eroding the patentee’s sales price, and causing the patentee to lose collateral sales of nonpatented products.¹⁸ As discussed in Chapter 5, in measuring lost profits damages, it is important that the legal rules allow the patentee flexibility in creating the world but for infringement. But the legal rules must also recognize how alternatives to the patented invention would have affected profits in order to align patent law and competition policy.

¹³Cotter at 138 (12/5/09); Squires at 168 (12/5/09); NERA Economic Consulting Comment at 11 (3/9/09); BLAIR & COTTER, *supra* note 7, at 47.

¹⁴Riles v. Shell Exploration and Prod. Co., 298 F.3d 1302, 1311-12 (Fed. Cir. 2002) (“Compensatory damages, by definition, make the patentee whole, as opposed to punishing the infringer.”).

¹⁵See, e.g., Brooktree Corp. v. Advanced Micro-Devices, Inc., 977 F.2d 1555, 1579 (Fed. Cir. 1992).

¹⁶Aro Mfg. Co. v. Convertible Top Replacement Co., 377 U.S. 476, 507 (1964) (*quoting* Livesay Window Co. v. Livesay Indust., Inc., 251 F.2d 469, 471 (5th Cir. 1958)).

¹⁷JOHN M. SKENYON, CHRISTOPHER S. MARCHESE & JOHN LAND, PATENT DAMAGES LAW AND PRACTICE §§ 1.1, 1-3, 1-4 (2008). The treatise continues, “it is probably the failure to recognize this basic premise that has resulted in many of the large damages awards for the patentee – awards that otherwise might have been substantially limited.” *Id.*

¹⁸See, e.g., Ericsson, Inc. v. Harris Corp., 352 F.3d 1369, 1377-79 (Fed. Cir. 2003) (upholding a lost profits award that included compensation for sales lost to the infringer and price erosion attributable to the infringing activity).

Lost profits damages will not be appropriate when the patentee does not manufacture a product. Rather, the patentee would likely seek to license its patent for the maximum amount that it could extract from the infringer in the technology licensing market. In that situation, putting a patentee in the position it would have been but for the infringement and compensating the patentee as the market would have requires replicating the bargain the parties themselves would have struck prior to infringement. This requires calculating reasonable royalty damages based on a hypothetical negotiation between a willing licensor (the patentee) and a willing licensee (the infringer).¹⁹ Properly implemented, the hypothetical negotiation can align patent damages law and competition policy. The law adopts the hypothetical negotiation approach,²⁰ but sometimes gives the willing licensor/willing licensee model short shrift, as discussed in Chapter 6. Moreover, implementing that model raises many difficult conceptual and evidentiary issues, as discussed in Chapter 7.

B. Permanent Injunctions

The Patent Act requires that following a finding of infringement a district court consider the “principles of equity” in deciding whether to grant a permanent injunction against infringement.²¹ In *eBay v. MercExchange*, the Supreme Court rejected a “general rule” favoring the grant of injunctions and listed four equitable factors that a patentee must satisfy to obtain an injunction:

1) that it has suffered an irreparable injury; 2) that remedies at law[, such as monetary damages,] are inadequate to compensate for that injury; 3) that, considering the balance of hardships between the [parties], a remedy in equity is warranted; and 4) that the public interest would not be disserved by a permanent injunction.²²

Permanent injunctions play a critical role in protecting the exclusivity that allows a patentee to reap the market reward for its invention following a finding of infringement. By maintaining control of the invention, a patentee can maximize its returns. For example, a manufacturing patentee can maximize profits by controlling the quantity of its innovative product offered in the marketplace. Similarly, a research firm patentee might obtain the highest royalty by negotiating an exclusive license with the company best-suited to commercialize the invention.

¹⁹Many panelists and commentators agreed that the hypothetical negotiation construct is the correct approach for determining reasonable royalty damages. *E.g.*, Cotter at 138 (12/5/09); NERA Economic Consulting Comment at 11 (3/9/09).

²⁰*Unisplay, S.A. v. American Elec. Sign Co.*, 69 F.3d 512, 517 (Fed. Cir. 1995) (“The statute contemplates that when a patentee is unable to prove entitlement to lost profits or an established royalty rate, it is entitled to “reasonable royalty” damages based upon a hypothetical negotiation between the patentee and the infringer when the infringement began.”).

²¹35 U.S.C. § 283.

²²*eBay, Inc. v. MercExchange, LLC*, 547 U.S. 388, 391 (2006).

The threat of an injunction also creates a significant deterrent to infringement that allows patentees to earn the full market reward supported by an exclusive position without litigation. An injunction has consequences reaching beyond a possible damages award. If an adjudged infringer has sunk costs into research and development or a plant and equipment to produce the infringing product, it risks losing that investment if it cannot obtain a license.²³ The injunction may render the infringer's inventory valueless, making it impossible to recoup those sunk costs. For that reason, many firms attempt to ensure freedom to operate or "patent clearance" before embarking on a research and development track, either to avoid an area already covered by patents or to seek a license to the patented technology.²⁴

Under some circumstances, however, the threat of an injunction can lead an infringer to pay higher royalties than a competitive market would award for a minor invention having several alternatives. Where a patentee asserts a patent seeking an ex post licensing agreement, and the infringer has sunk costs in product design and production using the patented technology, switching to an alternative technology may be very costly. In that case, the patentee can use the threat of an injunction to obtain royalties covering not only the value of its invention compared to alternatives, but also a portion of the costs that the infringer would incur if it were enjoined and had to switch. This higher royalty based on switching costs is called the "hold-up" value of the patent. In this situation, the patentee's compensation is no longer aligned with the value of its technology compared to alternatives. In some situations, this outcome can lead to the problems of overcompensation described below. Chapter 8 discusses how injunction analysis can balance the competing concerns of protecting incentives to innovate while avoiding overcompensation.

C. The Problems of Under and Overcompensation

Patent remedies that either under or overcompensate patentees compared to the market reward absent infringement harm consumers in multiple ways. The size of damage awards determines the amount that the infringer must pay the patent holder as compensation for past infringement. The effects of damages, however, extend beyond cases in which they are awarded. Damage awards have a "ripple effect" on the far larger number of cases in which royalties are negotiated to avert or settle litigation as part of an ex post patent transaction.²⁵

²³See, e.g., Mark A. Lemley & Carl Shapiro, *Patent Hold-Up and Royalty Stacking*, 85 TEX. L. REV. 1991 (2007); Vincenzo Denicolò, Damien Geradin, Anne Layne-Farrar, and A. Jorge Padilla, *Revisiting Injunctive Relief: Interpreting eBay in High-Tech Industries with Non-Practicing Patent Holders*, 4 J. COMPETITION L. & ECON. 571, 573-4 (2008); Vincent E. O'Brien, *Economics and Key Patent Damages Cases*, 9 U. BALT. INTELL. PROP. L.J. 1, 19 (2000); BLAIR & COTTER, *supra* note 7, at 231. The deterrent effect of injunctions following the *eBay* decision is discussed in Chapter 8, Section IV.A, *infra*.

²⁴See Chapter 8, Section IV.A; Chapter 3, Section II.

²⁵Marian Underweiser, *Towards an Efficient Market for Innovation* 1, presented at FTC Hearing: The Evolving IP Marketplace (Feb. 11, 2009) ("Court awarded reasonable royalty determinations provide the backdrop against which all patent settlements and patent licensing activities are measured."). The size of damage awards will have less influence over ex ante patent transactions, where the cost and value of

Remedies that systematically undercompensate patentees reduce incentives to innovate below levels intended by the patent laws. Denials of injunctions can undermine the ability of patentees to obtain the full market reward by commercializing their inventions. Damage awards that do not make the patentee whole make investment in the creation and development of new technologies less likely. Under these circumstances, inventors would also be more likely to rely on trade secrets rather than patents to protect intellectual property, thus undermining the patent system's benefit of public disclosure.²⁶

Panelists warned that reducing available remedies, by either lowering damages or restricting injunctions, would impair investment in innovation. Without a credible threat of injunction and damages, start-up companies could not attract the capital they need to develop an invention into an innovative product. Design firms that create new technology and license it to others for manufacture could not adequately protect that technology from misappropriation. Large companies could not deter copying of the features that differentiate their products.²⁷

On the other hand, remedies that overcompensate patentees beyond the market reward are not benign. When market conditions allow excessive royalties from damages or the threat of high damages to be passed on to consumers, prices increase.²⁸ Consumers are deprived of the benefits of competition among technologies if the size of damage awards and royalties do not reflect that competition. Moreover, it is a false logic to argue that higher damage awards will simply create greater incentives to innovate, lead to more innovation, and increase consumer welfare. Inflated awards, just like inadequate awards, can have the perverse effect of retarding

alternative technologies will likely have a bigger effect on royalty rates.

²⁶NERA Economic Consulting Comment at 2 (3/9/09); OSKR Comment at 1, n.1 (5/5/09); O'Brien, *supra* note 23, at 3.

²⁷Lasersohn at 183 (2/11/09) ("If you do not allow inventors to capture the full economic value of their invention . . . the amount of [projects] that will qualify for venture capital financing will decrease."); *id.* at 184 (patent "damages, injunctive relief and other things are simply absolutely critical" to promoting investment in new technologies); Maghame at 172-73 (2/11/09) (explaining that where infringers force them to litigate to obtain appropriate compensation, "having the flexibility to determine the amount of damages is absolutely necessary"); Rhodes at 165 (2/11/09) (describing how, in other jurisdictions, "where there aren't effective remedies for infringement . . . infringement becomes a cost of doing business. It's cheaper to free ride on someone else's R&D and pay the slap on the wrist penalty than it is to do your own R&D.").

²⁸Some have recognized a degree of circularity in the effect of damages on licensing rates. Because parties negotiate a license in the shadow of litigation, the potential damage award will influence the negotiated rate. However, the law looks to the royalty the market would award to establish damages. *See* SUZANNE SCOTCHMER, INNOVATION AND INCENTIVES 211-12 (2004). This circularity is attenuated in an *ex ante* licensing negotiation by the licensee's ability to use an alternative technology and his unwillingness to pay more than the incremental value the invention adds to the infringing product, regardless of the size of any potential damage award.

innovation.²⁹ When infringers are also innovators, the inflated damage awards they pay will reduce returns from their own R&D efforts, which can decrease innovation. Inflated awards can also drive higher licensing fees that increase costs and decrease innovation.

Patent damages that overcompensate patentees compared to the market reward incentivize speculation through the purchase and assertion of patents in litigation. If patent holders can obtain more in patent damages through litigation than they could by ex ante licensing in the marketplace where their inventions compete with alternatives, the result will be excessive litigation³⁰ that diverts funds from innovative and productive activities.³¹ Overcompensation through damages encourages ex post transactions at the expense of ex ante transactions with technology transfer.³²

Overcompensation can deter socially beneficial challenges to invalid or narrow patents, which also raises the cost of innovation. As the risk of paying an inflated award increases, would-be innovators will tend to enter into licenses rather than challenge claims that may be weak, perhaps paying unnecessary royalties.³³ Alternatively, manufacturers may incur higher costs by using a different technology to avoid even a weak threat of infringement. Inflated damage awards also discourage innovative activity when companies minimize their exposure by stopping research and development in technology for which patent coverage is uncertain. As patent awards increase relative to harm from infringement, innovation that is distinct from, but at the fringes of, patented technology may be abandoned.³⁴

Inflated damage awards can also have broader effects on an industry. Overcompensating a category of patents disrupts the ability of the market to allocate R&D resources to those areas most likely to generate the products most valued by consumers. Overcompensation of certain patented technologies over-incentivizes invention in that area, to the detriment of more productive innovative activity. It also over-incentivizes the pursuit of patents for their own sake,

²⁹Carl Shapiro, *Patent Reform: Aligning Reward and Contribution*, 8 NAT'L BUREAU OF ECONOMIC RES. 111, 113, in *INNOVATION AND THE ECONOMY* (2007) ; see also Business Software Alliance Comment at 6 (2/5/09).

³⁰This scenario assumes that manufacturers cannot identify all relevant patents and arrange licenses prior to commercialization, as is the case when the notice function of patents fails. See Chapter 3, Section II.

³¹Software & Information Industry Association Comment at 4 (2/5/09); OSKR Comment at 1 (5/5/09); Marian Underweiser, *Towards an Efficient Market for Innovation* 3, presented at FTC Hearing: The Evolving IP Marketplace (Feb. 11, 2009), available at <http://ftc.gov/bc/workshops/ipmarketplace/feb11/docs/munderweiser.pdf>.

³²Chapter 2, Section III.B.

³³O'Brien, *supra* note 23, at 20, Thomas at 145 (12/5/08).

³⁴Shapiro, *supra* note 29, at 112; BLAIR & COTTER, *supra* note 7, at 60.

unnecessarily increasing the number of patents in a given field beyond what is necessary to encourage productive innovation. Large numbers of patents can create “patent thickets”³⁵ and increase transaction costs for manufacturers that seek to clear the rights needed to produce a product.³⁶

Some panelists asserted that concerns about overcompensation of patentees through damages were exaggerated because damages are unable to put a patentee in the position it would have been but for the infringement, given the high cost of litigation and consumption of company resources.³⁷ Panelists representing independent inventors described large manufacturers that would use inventions with impunity, knowing that the high cost of patent enforcement meant they would rarely be stopped.³⁸ On the other hand, panelists representing manufacturing companies that were defendants in patent litigation described settling weak infringement suits to avoid litigation costs and settlement negotiations that focused more on the cost of litigation than the value of the invention.³⁹

The high cost of patent litigation is undoubtedly a significant issue for both producers and users of technology,⁴⁰ but it does not justify unmooring damages calculations from an economic foundation rooted in the creation of a world but for infringement. Doing so makes damages unpredictable and risks distorting market-based incentives in the ways described above. The problem of high litigation costs should be addressed directly, although that issue is outside the scope of this report.

³⁵2003 FTC IP Report, ch. 3, at 34-35. Defensive patenting also contributes to patent thickets, especially in the IT industries. *Id.*; Chapter 2, Section III.A.

³⁶BLAIR & COTTER, *supra* note 7, at 17-19.

³⁷Rhodes at 195-96 (2/11/09); Johnson at 188 (2/11/09); Maghame at 203 (2/11/09); Cassidy at 183-84 (2/12/09).

³⁸Ryan at 32-33 (4/17/09); *see also Fromson v. Western Litho Plate & Supply Co.*, 853 F.2d 1568, 1574 (Fed. Cir. 1988) (suggesting that under the hypothetical negotiation approach to damages, “a cold, ‘bottom line’ logic would dictate to some a total disregard of the individual inventor’s patent”).

³⁹IBM Comment at 2 (2/12/09) (citing “costly settlement in advance of litigation” as one consequence of patents “lack[ing] clear boundaries”); Yen at 52-53 (12/5/10) (describing how high litigation costs even for “baseless assertions,” difficulty in establishing invalidity and uncertainty regarding damage determinations can lead to “unmeritorious settlements”).

⁴⁰NAT’L RES. COUNCIL, A PATENT SYSTEM FOR THE 21ST CENTURY 38 (Stephen A. Merrill, Richard C. Levin & Mark B. Myers eds., 2004) (discussing potential negative effect of high cost of patent litigation on innovation).

IV. CONCLUSION

Patent damages that either under or overcompensate patentees for infringement compared to the market can have detrimental effects on innovation and competition. Undercompensation undermines the patent system's incentives to innovate. Overcompensation raises costs to other innovators through multiple mechanisms and can deter innovation. As discussed in Chapter 2, overcompensation through damages also risks encouraging patent speculation, ex post licensing and "being infringed" as a business model rather than more productive efforts at technology transfer. Damage awards that do not track the value of a patented invention compared to alternatives can deprive consumers of the benefits of competition among technologies.

To align patent damages law and competition policy, it is, therefore, important that damage awards attempt to accurately replicate the market reward an invention could have earned absent infringement. Calculating accurate damages is a difficult task, however. The following chapters attempt to provide insights on how to structure an economically grounded damages analysis to help accomplish this task.